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BOTANICAL ABSTRACTS

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BOTANICAL ABSTRACTS

A monthly serial furnishing abstracts and citations of publications in the international field of botany in its broadest sense.

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THE BOARD OF CONTROL OF BOTANICAL ABSTRACTS, INC.

J. R. SCHRAMM, Editor-in-Chief
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Vol. 12

JUNE, 1923

No. 5

ENTRIES 2900-3649

AGRONOMY

C. V. PIPER, *Editor*

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(See also in this issue Entries 2968, 2971, 2974, 3006, 3038, 3101, 3139, 3158, 3177, 3188, 3207, 3249, 3253, 3254, 3281, 3288, 3450, 3462, 3526, 3561, 3567, 3574, 3576, 3606)

2900. ANONYMOUS. Combating droughts. Jour. Dept. Agric. Victoria 18: 716. 1920.—The appointment of a commission by the Parliament of the Government of South Africa to inquire into the best methods of combating drought is announced.—*Wm. E. Lawrence.*

2901. ANONYMOUS. Die Bedeutung des Kalkes für Pflanze und Boden. [The significance of lime for the plant and the soil.] Mitteil. Deutsch. Landw. Ges. 38: Flugblatt 66. 1 p. 1923.

2902. ANONYMOUS. Eradication of St. John's wort by means of introduced insects. Jour. Dept. Agric. Victoria 19: 187-188. 1921.—The results of investigations in England were practically negative. The phytophagous beetle (*Chrysomela varians*) appeared to be the only insect that did any serious harm to *Hypericum perforatum*. The introduction of such an insect into Australia is regarded as a very dangerous experiment.—*W. E. Lawrence.*

2903. ANONYMOUS. Meteorology and agriculture. Jour. Ministry Agric. Great Britain 29: 432-436. 1922.—This summary of the report of a committee appointed by the Agricultural Research Council discusses the relation of meteorological research and weather forecasting to agriculture, giving the plan of issuing forecasts in England, together with suggestions for further investigations.—*Roland McKee.*

2904. ANONYMOUS. Pasture top-dressing. Jour. Dept. Agric. Victoria 19: 238-239. 1921.—The application of superphosphate and lime gave better results than superphosphate alone or basic slag. The fertilizers markedly improve the bulk, quality, and palatability of the herbage, and increase the percentage of native clovers.—*Wm. E. Lawrence.*

2905. ANONYMOUS. Rotation for hay growing. Jour. Dept. Agric. Victoria 19: 237. 1921.—“During the past seven years the yields of hay grown after bare-fallow, and after barley and bare-fallow, have been more than double the yield of the plot on which hay was grown continuously.”—*Wm. E. Lawrence.*

2906. ANONYMOUS. The oat crop. Results of departmental experiments. Jour. Dept. Agric. Victoria 19: 235-236. 1921.—Superphosphate fertilizer produced better yields than the basic types.—*Wm. E. Lawrence.*

2907. ANONYMOUS. Weather cycles in relation to agriculture and industrial fluctuations. Nature 110: 889-890. 1922.—This article contains reviews of several papers presented at the Hull meeting of the British Association.—*O. A. Stevens.*

2908. ANONYMOUS. Wheat experiment plots. Jour. Dept. Agric. Victoria 19: 231-234. 1921.—The highest yields in the Wimmera and Mallee districts were obtained from Gallicoli, a new hybrid wheat.—*Wm. E. Lawrence.*

2909. AUDAS, J. W. The true clovers naturalized in Victoria. Jour. Dept. Agric. Victoria 19: 650-660. 2 fig. 1921.—Botanical and agricultural information is given for 6 species of introduced clovers.—*Wm. E. Lawrence.*

2910. BARTELS, L. C. Lucerne experiments. State Research Farm, Werribee. Jour. Dept. Agric. Victoria 19: 608-611. 1921.—The results are given of variety, rate and frequency of watering, and time of cutting tests.—*Wm. E. Lawrence.*

2911. BEVAN, W. Cyprus tobacco. Cyprus Agric. Jour. 17: 34. 1922.—Samples of Cyprus-grown tobacco were sent to the Imperial Institute to ascertain their commercial value either for smoking or for nicotine extract. Thus far it has not been possible to find buyers for the tobacco now on hand; further production except for home use is therefore not recommended.—*Wm. Stuart.*

2912. BEVAN, W. Latakia tobacco industry in Cyprus. Cyprus Agric. Jour. 17: 82-83. 1922.—According to the author the Latakia tobacco industry was established in Cyprus during the late war by a small group of Syrians. The writer claims that the preparation of Latakia tobacco is a simpler process than that required for cigarette tobacco. Information is given on handling and curing the crop.—*Wm. Stuart.*

2913. BEVAN, W. Seed potatoes. Cyprus Agric. Jour. 17: 36. 1922.—Growers in the plains area of Cyprus usually send their seed stock to the higher lands to be grown the following year and returned. The 1-year subjection of the seed to a colder and later climate seems to renew, or at least prolong, its vigor.—*Wm. Stuart.*

2914. BRÜNE, F. Der Kartoffelbau in den Mooregebieten Nordwestdeutschlands. [Potato culture in the moor area of northwest Germany.] Mitteil. Deutsch. Landw. Ges. 38: 7-12. 1923.—The best cultural and fertilizing methods for potatoes on moor soils are outlined. The following points are mentioned as especially important: planting of varieties of strong growth; avoiding too early planting; maintaining a high water table in spring; rolling the field immediately after planting and after each harrowing; and avoiding hilling. To these should be added the selection of adapted varieties.—*A. J. Pieters.*

2915. CUNNINGHAM, C. C., and B. S. WILSON. Varieties of corn in Kansas. Kansas Agric. Exp. Sta. Bull. 227. 40 p., 9 fig. 1921.—A study was made of a large number of varieties of corn throughout the state in cooperative tests with farmers. Because of seasonal variations, no one variety proves consistently superior to all other varieties in any one locality. Home-grown seed of adapted varieties outyields introduced seed. Varieties of corn developed under adverse climatic conditions in western Kansas are usually more vigorous and hardy than varieties similar in size and developed in the corn belt. Early varieties from western Kansas when grown in eastern Kansas outyield early varieties from the northern states.—*L. E. Melchers.*

2916. DAVEY, H. W. Weeds and their eradication. Jour. Dept. Agric. Victoria 19: 661-664, 705-714. Fig. 1-8. 1921; 20: 10-18. Fig. 9-15. 1922.—This series of articles is prefaced by a general statement about weed control. In part they deal with the control of St. John's wort (*Hypericum perforatum* L.). Experiments were conducted in the Bright district of Victoria, Australia, to determine the ability of strong growing grasses and other plants to force back and ultimately suppress this weed. The heavy crop of dried St. John's wort was burned off, the land plowed shallow and harrowed, and grass seeds sown. After 2 years the following grasses gave most promise: *Poa pratensis*, *Festuca duruiscula*, *Dactylis glomerata*, *Festuca rubra*, *Cynosurus cristatus*, in the order named. The Subterranean clover (*Trifolium subterraneum*) grew luxuriantly, covering the St. John's wort during the spring and autumn; but it dies down during the summer, thus permitting the revival of the weed. Grasses gave better results. *Hypericum androsaemum*, *H. calycinum*, and *H. aponicum* are described briefly.—Wm. E. Lawrence.

2917. DAVIDSON, W. D. The Irish seed potato trade, with some notes on the distinguishing features of the principal varieties of potatoes. Jour. Dept. Agric. Ireland 22: 3-13. 1922.—Irish and Scotch seed are equally good in Ireland and England, and better than English. Inspection and varietal certification are restricted to varieties immune to black scab, of which a few are described.—Donald Folsom.

2918. DAVIS, ROBT. L. Pedigreed fiber flax. U. S. Dept. Agric. Bull. 1092. 22 p., 9 fig. 1922.—Improved strains of flax have been developed by selection methods. A semi-commercial test showed the pedigreed strains to be superior to commercial fiber flax. A special score card and special instruments for cross-pollinating and for measuring flax have been devised and efforts are now being made to combine desirable characters by crossing the different strains.—J. T. Buchholz.

2919. DOWNING, R. G., and C. McCauley. Field experiments with wheat. Summary of variety trials, 1911 to 1921. Cowra experiment farm. Agric. Gaz. New South Wales 33: 837-843. 1922.—Cowra is situated some 200 miles from Sydney and is in a good wheat-producing section. About 20 varieties were under trial for 3 years or more, planted early, medium, and late and for both grain and hay. Canberra and Yandilla King were outstanding in yield. Notes are given on all varieties, including those not recommended.—L. R. Waldron.

2920. FARRELL, J. New Zealand flax (*Phormium tenax*). Propagation, cultivation, and milling treatment. Jour. Dept. Agric. Victoria 18: 658-671, 705-716. Fig. 1-17. 1920; 19: 77-88, 143-156, 209-223. Fig. 18-40. 1921.—The plant is native of New Zealand and Norfolk Island, and is also found in the Chatham Islands. It was used by the natives before white colonists arrived, and considerable trade was developed by 1828. Of the many varieties, 60 were distinguished by the Maoris before 1870. It is said to thrive better under irrigation than in its native habitat. Less confusion regarding the fiber has existed since it became known as New Zealand hemp. The true flax (*Linum usitatissimum*) fibers are bast cells of the stem, whereas the *Phormium* fibers are derived from the prosenchymatous wood-cells of the vascular bundles in the leaf. Both the soil and climate of Australia are well suited to the production of *Phormium* fiber. It is used in the manufacture of binder twine, rope, and other cordage; the ropes are very durable, resisting weathering action better than Manila hemp or hemp.—Wm. E. Lawrence.

2921. FOY, R. NELSON. Seed testing notes. New Zealand Jour. Agric. 24: 92-93. 1922.—Meadow foxtail (*Alopecurus pratensis*) and *Poa trivialis* are important grasses, but it is difficult to secure seed with high percentage of germination. Impurities are mentioned.—N. J. Giddings.

2922. GALLAGHER, P. Selection of seed maize. New Zealand Jour. Agric. 24: 79-82. 3 fig. 1922.—Types of ears are discussed and methods of improving corn by seed selection are suggested.—N. J. Giddings.

2923. GANZ. Künstliche Beregnung von Ackerfeld. [Artificial watering of fields.] Mitteil. Deutsch. Landw. Ges. 38: 40. 1923.—Oats, summer and winter barley, luzerne, potatoes, and rutabagas were watered and large increases in yields secured during 3 years. The method of watering is not described.—A. J. Pieters.

2924. GERLACH. Die inländische Eiweisserzeugung. [Domestic protein production.] Mitteil. Deutsch. Landw. Ges. 37: 438-442. 1922.—Attention is called to the fact that before the war $\frac{1}{2}$ of the protein consumed in Germany was imported. The following methods are suggested for increasing the protein supply: (1) increased production, especially the per acre yields, by the use of nitrates; (2) increasing the acreage planted to high protein crops, such as peas, beans, vetches, clover, and lucerne for the better soils and lupines and serradella for sand; (3) production of greater quantities of grass with higher protein content on meadows and pastures (top dressing with nitrate is recommended); (4) feeding urea to cattle to save protein (this process is not yet beyond the experimental stage but has great significance); (5) preventing the loss of fresh fodder in making hay and in the earth pits. To this end the use of fermentation chambers, silos, and the use of the electric current is advised. In the discussion emphasis was placed on the effect of nitrates in encouraging the production of grass at the expense of the legumes. The increased production of lupines on light lands and the breeding of improved varieties was urged. Regarding the ensiling of legumes it was brought out that the use of electric current quickly to raise the temperature had been successful, the disadvantages of this method being the difficulty of always commanding sufficient current. The importance to German agriculture of investigations on ensiling methods was stressed.—A. J. Pieters.

2925. GERLACH. Die Verfütterung von Kartoffeln an Pferde. [Feeding potatoes to horses.] Mitteil. Deutsch. Landw. Ges. 37: 739-740. 1922.—A general statement is made concerning feeding of potatoes to horses, together with advice as to the best methods.—A. J. Pieters.

2926. GORDON, GEORGE S. Farm notes for December, 1920 and January, 1921. Jour. Dept. Agric. Victoria 19: 117-124. Fig. 1-3. 1921.—The results of plot tests on the selection and rotation of wheat are given.—Wm. E. Lawrence.

2927. GORDON, GEORGE S. Farm notes for February. Experimental work at State Research Farm, Werribee. Jour. Dept. Agric. Victoria 19: 181-185. 2 fig. 1921.—In a wheat-growing region of 20 inches annual rainfall a suitable green crop, fed off with sheep, is recommended instead of bare fallowing or plowing in "green manure." Algerian oats gave best results for feeding value, with barley, rape, and peas next in order of value. Wheat following barley was almost ruined by "take all" (*Ophiobolus graminis* Sacc.). A clean crop of wheat followed crops of Algerian oats, rape, and peas.—Wm. E. Lawrence.

2928. GORDON, GEORGE S. Summer forage crops. Jour. Dept. Agric. Victoria 19: 441-444. Illus. 1921.—Results of field tests are given.—Wm. E. Lawrence.

2929. GOULDEN, C. H. Oat production in Saskatchewan. Sci. Agric. 3: 125-134. 1922.—Canada produces about 10 per cent of the world's oat crop, of which Saskatchewan produces about $\frac{1}{3}$. In Saskatchewan oats are used as a straight grain crop, in cultivated rows, as partial substitute for summer fallow, as an annual hay crop, in annual pasture mixtures, and as a nurse crop for grasses and clovers. The leading varieties are Banner, Gerlach, Gold Rain, Abundance, Sixty Day, Cole, Leader, and Liberty. A brief discussion of the ordinary methods of cultivation is given.—T. G. Major.

2930. HANSEN, K. *Planteavlten 1921. [The crops of 1921.] Tidsskr. Landokonomi 1922: 436-468. 1922.*—A detailed report is presented of the 1921 crop yields in Denmark, including the province of Slesvig.—*Albert A. Hansen.*

2931. HENSEL, R. L., and E. P. HARLING. *Russian knapweed: A new weed in Kansas. Kansas Agric. Exp. Sta. Circ. 94. 4 p., 2 fig. 1922.*—This weed, *Centaurea calcitropa* L., was reported in Washington County, Kansas, in July 1921.—*L. E. Melchers.*

2932. KEANE, J. *Rotation system for hay growing. Jour. Dept. Agric. Victoria 19: 367-374. 2 fig. 1921.*—A rotation with summer fallow gave better results than "hay after barley and bare-fallow" or "hay after barley and peas" where rainfall during the growing period is the limiting factor.—*Wm. E. Lawrence.*

2933. KING, C. J. *Water-stress behavior of Pima cotton in Arizona. U. S. Dept. Agric. Bull. 1018. 24 p., 4 pl. 1922.*—A report is given of the results of an investigation of the behavior of Pima cotton when grown under different conditions of soil moisture and available plant food in Salt River Valley, where the growing season, though ample for substantial yields, is none too long for the complete development of the plant. Mean period of maturation for 3000 bolls was 68 days, early bolls maturing within a much shorter period than later sets, with a mean difference of 27 days between July and September blooming. "Water-stress" affects most seriously the plants with greatest vegetative growth. Effect of root systems on water-stress behavior was studied and is discussed. There is little difference in size of roots between large and small plants. Severe water-stress in luxuriant plants was not always induced by lack of available moisture throughout the soil mass, but was probably caused by the reduction of the moisture in the soil immediately surrounding the roots faster than it could be restored by capillarity. An important relation is shown between increase in shedding rate during the first 2 months of the flowering season and the gradual reduction of moisture content in the lower soil layers. Heavy rain materially shortened the interval between flowering and shedding. Irrigation water supplied after flower buds begin to form and frequently thereafter produced greater stem growth and a greater number of flowers during the first 45 days of flowering than plants irrigated 16 days later. Sparingly watered plants produced a maximum number of bolls late in the season. An effort should be made to stimulate setting of fruit to the fullest extent during July and August, since the bolls set during this period largely determine the crop.—*J. T. Buchholz.*

2934. KNAPP, GEORGE S. *Relation of crop yields to quantity of irrigation water in southwestern Kansas. Kansas Agric. Exp. Sta. Bull. 228. 29 p., 11 fig. 1922.*—A study was made of the amount of irrigation water used by sorghums, barley, oats, and wheat under field conditions, and its effect on yields of grain and clover.—*L. E. Melchers.*

2935. MCGOWAN, H. E. *Commercial potato growing. New Zealand Jour. Agric. 24: 85-87. 1922.*—Where machinery is used for planting and harvesting, the average cost of production and marketing is about \$180 per acre. Oversupplies may be used in making alcohol or potato flour.—*N. J. Giddings.*

2936. MALTE, M. O. *The 1000-kernel weight of seed in relation to experimental error. Sci. Agric. 3: 69-71, 119-122. 1922.*—Because of great variation in the 1000-kernel weight, it is necessary, in order to obtain as equal stands as possible, to take the 1000-kernel weight into consideration and sow varying amounts of seed, calculated on the basis that equal numbers of germinable seed should be applied to equal areas.—*T. G. Major.*

2937. MAUME, L. *Le chlorhydrate d'ammoniaque et les engrais azotés. [Ammonium chloride and the nitrogenous fertilizers.] Ann. Ecole Nation. Agric. Montpellier 17: 246-250. 1918/1919.*—It was found that with wheat, ammonium chloride gave results comparing favorably with those obtained when sulphate of ammonia or calcium nitrate were used.—*F. F. Halma.*

2938. MOE, G. G. Improvement of farm crops in British Columbia. *Sci. Agric.* 3: 82-86. 1922.—An outline is given of the methods of breeding small grains, grasses and clovers, potatoes, corn and rye, and root crops.—*T. G. Major*.

2939. MULLETT, H. A. Crop and fallow competition, Horsham, 1920. *Jour. Dept. Agric. Victoria* 19: 356-363. 4 fig. 1921.—The crop and fallow competitions aim to discover and disseminate information concerning the methods by which the best wheat crops are raised in the respective districts. The results are given for the above district.—*Wm. E. Lawrence*.

2940. MULLETT, H. A. Crop and fallow competition. Report on the Warracknabeal crop and fallow competition. *Jour. Dept. Agric. Victoria* 19: 65-72. 5 fig. 1921.—The results emphasize the importance of fallowing, and the use of sheep to increase yields and keep down the weeds and the take-all disease caused by *Ophiobolus graminis* Sacc.—*Wm. E. Lawrence*.

2941. MULLETT, H. A. Dimboola crop and fallow competition, 1920. *Jour. Dept. Agric. Victoria* 19: 257-266. 6 fig. 1921.—This article emphasizes greater care in smut control and gives directions.—*Wm. E. Lawrence*.

2942. MULLETT, H. A. Grassing golf links and recreation fields. What has been done by the Royal Melbourne Golf Club at Sandringham. *Jour. Dept. Agric. Victoria* 19: 749-751. 1921.—Methods are described by which a high class turf was established on poor soil; also the subsequent management. The turf is composed of couch grass (*Cynodon dactylon*) Kentucky Blue grass (*Poa pratense*), and annual meadow grass (*Poa annua*). The greens are laid down with Chewing's fescue (*Festuca duriuscula*) [*Festuca rubra* var. *foliar*].—*Wm. E. Lawrence*.

2943. MULLETT, H. A. Inter-district farm competition. Royal Agricultural Society's second competition, 1920-21.—prizes £ 100. *Jour. Dept. Agric. Victoria* 19: 385-426. *Illus.* 1921.—The author relates the benefits derived. "Some 23,000 acres of wheat and 10,000 acres of summer fallow were subjected to a careful investigation and classification" distributed in farms ranging from 513 to 3,000 acres. Judgment was based upon a consideration of the cropping systems, crops, fallows, live stock, storage of water, fodder reserves, and other factors. The results obtained are described.—*Wm. E. Lawrence*.

2944. MULLETT, H. A. Mallee settlement successful. Second Ouyen farm competition. *Jour. Dept. Agric. Victoria* 19: 193-206. 12 fig. 1921.—These competitions are educational in character, stimulating the adoption of up-to-date farming methods. Despite the dense mallee scrub the land may be rapidly and cheaply brought under cultivation, and substantial returns secured the 1st year of settlement. Wheat-growing and sheep raising are recommended.—*Wm. E. Lawrence*.

2945. MULLETT, H. A. Nhill crop and fallow competition. *Jour. Dept. Agric. Victoria* 19: 129-142. *Illus.* 1921.—The results of the annual competitions have shown the value of later seeding, deeper plowing, increased seeding, and manuring. Later seeding permitted the first crop of weeds to be destroyed before planting and a greater yield resulted.—*Wm. E. Lawrence*.

2946. NEWMAN, L. H. Origin of false wild oats. *Sci. Agric.* 3: 169-170. 1923.—This review of an article by Å. ÅKERMAN [Sveriges Utsädesförenings Tidskrift, 1921] contains an application to Canadian conditions. Since it appears that the false wild oat is a mutation and not connected with true wild oats, it should not be considered a dangerous weed.—*T. G. Major*.

2947. PRIDHAM, J. T. Natural crossing—a danger in growing seed wheat. *Agric. Gaz. New South Wales* 33: 849-850. 1922.—Natural crossing in wheat fields intended for seed production should be considered and impurities resulting therefrom rogued out.—*L. R. Waldron.*

2948. REMH. Der Kartoffelbau im Lichte eigener Erfahrungen und Beobachtungen. [Potato culture in the light of personal experiences and observations.] *Mitteil. Deutsch. Landw. Ges.* 38: 21-26. 1923.—The author considers the various factors controlling successful potato culture. Great stress is laid on high grade, disease-free seed. It is stated that slightly immature potatoes when used for seed yielded better than mature ones. Planting machinery, fertilizing, and spacing are among the other topics treated.—*A. J. Pieters.*

2949. RICHARDSON, A. E. V. Improvement of farm crops by selection. *Jour. Dept. Agric. Victoria* 19: 427-439. 6 fig. 1921.—Wheat yields per acre have shown greater increase than any other farm crop in Victoria. This is due to systematic and scientific study during the past 20 years. New varieties have been developed and better farming methods adopted. "There is an unlimited field in Australia for the application of the same systematic methods for the improvement of oat, barley, maize, and potato varieties." The different methods of improvement by seed selection are discussed with a brief consideration of each crop.—*Wm. E. Lawrence.*

2950. RICHARDSON, A. E. V. Some results in top-dressing of pastures. *Jour. Dept. Agric. Victoria* 19: 347-355. 2 maps. 1921.—The results of test plots show that an application of superphosphate, and of superphosphate and lime greatly increases the weight of the herbage, the percentages of clovers and trefoils, and the palatability and stock-carrying capacity of the herbage. These results are most marked in the regions having 20 or more inches of rainfall.—*Wm. E. Lawrence.*

2951. SEIFERT, ALFRED. Quality of New Zealand hemp. *New Zealand Jour. Agric.* 24: 89-91. 1922.—Export of Phormium fiber of the U. S. A. has fallen off due to faults in the milling of the leaves. Practical methods for improving the quality of the fiber are discussed.—*N. J. Giddings.*

2952. SHEPHERD, A. N., and J. M. PITT. Farmers' experiment plots. Maize experiments, 1921-22. *Agric. Gaz. New South Wales* 33: 844-848. 1922.—Notes are given on yields of maize for grain based upon variety trials and upon fertilizer trials for the Murrumbidgee irrigation areas and the lower north coast.—*L. R. Waldron.*

2953. SIMMERMACHER. Zur Stickstoffdüngung der Schmetterlingsblütler. [Nitrogenous fertilizers for legumes.] *Mitteil. Deutsch. Landw. Ges.* 38: 12-13. 1923.—In 1918 and again in 1922 certain lucerne fields were fertilized with various carriers of nitrogen, but in only 1 case out of 7 was there any increase from the use of the fertilizer, and this was small. Similar experiments were made with red clover, *Vicia faba* and peas, but in no case did nitrogenous fertilizers increase yields.—*A. J. Pieters.*

2954. SOUTHWORTH, W. Improvement of fodder corn for Manitoba and other prairie provinces. *Sci. Agric.* 3: 143-151. 1922.—Manitoba-grown seed corn is better for local conditions than that obtained from warmer climates. Strains maturing more rapidly have been isolated by selection. First-generation hybrid seed corn obtained from a cross between a small early variety and a large late variety gave a total crop yield of 4,795 pounds per acre, greater than the crop produced by seed from the larger parent.—*T. G. Major.*

2955. TAYLOR, E. MCK., and A. C. BURNS. The basis of Egyptian agriculture and its relation to the decline in the average yield per feddan of cotton. *Ministry Agric. Egypt Tech. and Sci. Serv. Bull.* 25. vi+70p., 4pl. 1922.—The history of the change from the basin system of irrigation to perennial irrigation and the modifications it has made in Egyptian

agriculture are given. Experimental data showing the effects of different fertilizer treatments on the growing of cotton, the chief crop introduced since the change in the methods of irrigating, are reported. A comprehensive bibliography is added.—*Lyman Carrier*.

2956. TENNENT, R. B. **Otago lucerne-growing competitions.** New Zealand Jour. Agric. 24: 170-171. 1922.—The competition was divided into 2 classes, one for irrigated and the other for non-irrigated lucerne. A 23-year old and a 16-year old irrigated field were entered, the former being one of the oldest in New Zealand, and having a truly remarkable stand. The latter secured 3rd place in the competition.—*Mary R. Burr*.

2957. TITUS, CHARLES P. **Cigarettes under the microscope.** 48 p. Publ. by author: East Orange, New Jersey. 1922.—The history of the cigarette is interwoven with that of tobacco. Chapter headings are: Historical, Botanical, Agricultural, Curing, Statistics, Microscopical, Chemical, Purity of product, Aromatics principles, Psychology of smoking, Bibliography. Tobacco seed average about 5000 per pod and nearly 500,000 per ounce, and retain germinating power for about 10 years.—*C. S. Gager*.

2958. TULLOH, I. M. **Goroke crop and fallow competition, season, 1920.** Jour. Dept. Agric. Victoria 19: 266-272. 2 fig. 1921.—This article gives recommendations for the treatment of heavy and light soils.—*Wm. E. Lawrence*.

2959. WAGNER, PAUL. **Stickstoffdüngung der Luzerne.** [Fertilizing lucerne with nitrogen.] Mitteil. Deutsch. Landw. Ges. 38: 49-51. 1923.—The author reports on pot and field experiments with sulphate of ammonia at various rates; in one case red clover was used. The results showed no, or unprofitable, increases in yield.—*A. J. Pieters*.

2960. WARD, F. E. **Some recent lucerne experiences in Canterbury.** New Zealand Jour. Agric. 24: 226-229. 2 fig. 1922.—This article discusses fertilizer experiments at Ashburton, and railway demonstrational areas.—*N. J. Giddings*.

BIBLIOGRAPHY, BIOGRAPHY, AND HISTORY

C. W. DODGE, *Editor*

(See also in this issue Entries 2920, 2955, 3044, 3097, 3143, 3236, 3238, 3243, 3249, 3288, 3334, 3344, 3379, 3503, 3574, 3621)

2961. ANONYMOUS. **Bernhard Eduard Fernow.** Science 57: 255-256. 1923.—This obituary notice of the prominent forester, author, and educator includes a brief biographical sketch, emphasizing his work in forestry.—*C. J. Lyon*.

2962. ANONYMOUS. **Index Kewensis, supplement V.** Kew Bull. 1921: 408. 1921.—The work, which covers the years 1911-1915, was published in 1921.—*T. J. Fitzpatrick*.

2963. ANONYMOUS. **International conference on phytopathology and economic entomology.** Science 57: 142. 1923.—Announcement is made of the conference to be held near Wageningen, Holland, June 25-30, 1923.—*C. J. Lyon*.

2964. ANONYMOUS. **Lists of staffs of the Royal Botanic Garden, Kew, and of the botanical departments, establishments and officers at home, and in India and the colonies, in correspondence with Kew.** Kew Bull. 1921: Appendix II: 27-42. 1921.—Names, titles, and lines of work are given.—*T. J. Fitzpatrick*.

2965. ANONYMOUS. **New Japanese botanical serials.** Nature 110: 891-892. 1922.—This is a brief statement regarding the first issues of the Japanese Journal of Botany and Acta Phytochimica.—*O. A. Stevens*.

2966. ANONYMOUS. **Obituary.** Sir Isaac Bayley Balfour. *Nature* 110: 816-817. 1922.—I. B. Balfour, son of J. H. Balfour who was professor of botany at the University of Edinburgh from 1845 to 1879, was born at Edinburgh on March 31, 1853, and died at Court Hill, Haslemere, on November 30, 1922. He was educated at the Edinburgh Academy and at the University, receiving a degree in science and later in medicine. He continued botanical studies in the universities of Strasbourg and Würzburg, and was appointed professor of botany in the University of Glasgow in 1879. In 1884 he became Sherardian Professor of botany at Oxford, and in 1888 professor of botany at the University of Edinburgh, King's Botanist for Scotland, and Regius Keeper of the Royal Botanic Garden. These positions he held until March, 1922. Prominent among his early work was a botanical survey of Socotra and studies of *Halophila* and *Pandanus*. Later he devoted much time to the genera *Primula* and *Rhododendron*. He contributed to the English edition of DeBary's Fungi, Mycetozoa and Bacteria and to the *Annals of Botany*.—O. A. Stevens.

2967. ANONYMOUS. **The centenary of Pasteur's birth.** *Science* 57: 17. 1923.—This is a list of several meetings held during December, 1922, throughout the world, with mention of the speakers on these occasions.—C. J. Lyon.

2968. ANONYMOUS. [The Lingnaam Agricultural Review.] *Lingnaam Agric. Rev.* [Canton, China] 11: 2nd unnumbered page. 1922.—This new semi-annual serial is announced of which the first number was published in December, 1922. It is intended primarily for the results of research carried on at Canton Christian College, but manuscripts on agricultural and related work by others in the Orient are invited. The serial is published by the College of Agriculture of Canton Christian College and is edited by C. O. Levine of the same institution. The subscription price is \$2.00 a year, but the publication will be sent on an exchange basis to "agricultural colleges and publishers of scientific and technical agricultural bulletins and periodicals."—J. R. Schramm.

2969. ANONYMOUS. **The Royal College of Science for Ireland.** *Nature* 110: 814-816. 1 fig. 1922.—This is a brief account of this college, founded in 1865.—O. A. Stevens.

2970. ANONYMOUS. **William Purdom.** *Kew Bull.* 1921: 408. 1921.—This is a note concerning the life and botanical work of Purdom who died at Peking, China, November 7, 1921.—T. J. Fitzpatrick.

2971. CHERRY, THOMAS. **The discovery of agriculture.** *Jour. Dept. Agric. Victoria* 19: 577-586, 641-649. 1921.—Evidence is given to show that barley, millet (probably a species of *Sorghum*) and the root tubers of the nut rush, (*Cyperus esculentus*), formed a part of human food at the beginning of Egyptian civilization. The author argues that these plants were found growing wild and that the art of cultivation was learned by imitating the natural conditions along the Nile, which occur in no other region. The Nile overflows at the end of the hot season and sufficient moisture remains in the soil to mature crops in the following spring, conditions which suit the requirements of barley and millet. The annual overflow would lead primitive man to scrape away shallow channels and throw up low ridges that the flood waters might pass to other ground. The periodic deepening of these channels would finally result in basin irrigation. Tillage by means of a stick may have started from the observation that areas trampled by wild animals produced a better growth of plants. The author denies that agriculture began in many independent localities, by a series of gradual steps. From a study of the biology and ecology of barley and wheat it appears that the wild ancestors of these cereals no longer exist and that the later stages of their evolution took place under special conditions. The author believes that barley originated in the Nile Valley and that wheat came from an island in the Aegean Sea, for on an island it would be protected from herbivorous animals, as it is defenseless in the struggle for existence. "They were evolved in regions of dry and nearly rainless summers, and therefore, not in any forest region (which implies heavy rainfall) or in a snow-clad winter climate." The rapid development of Egyptian civilization can be regarded as a natural consequence of the discovery of these 2 valuable plants.—Wm. E. Lawrence.

2972. FARMER, J. B. *The West Indian College of Tropical Agriculture.* *Nature* 110: 775-776. 1922.—This institution was opened on October 16. It has a site of 85 acres located about 7 miles east of Port of Spain, Trinidad. The site is considered exceptionally good. The provisional arrangement includes a 3-year diploma course, a 1-year elementary course, courses for agricultural officers, and facilities for graduate research.—*O. A. Stevens.*

2973. GOLDSCHMIDT, RICHARD. *Richard Hertwig und die experimentelle Zoologie.* [Richard Hertwig and experimental zoology.] *Naturwissenschaften* 8: 771-774. 1920.—This paper, one of a series of biographical sketches published in honor of Richard Hertwig's 70th birthday, deals with his work as an experimental zoologist.—*J. L. Collins.*

2974. LIPMAN, J. G. *Tendencies in agricultural research.* *Science* 57: 71-76. 1923.—In his address the author shows by an historical analysis how agricultural research gave effective aid to the pioneer stage of American agriculture. Recent progress has been along lines of soil building and exact information concerning soil biology. The present problems are those of proper handling and use of food resources, and conservation in every phase of farm activity.—*C. J. Lyon.*

2975. LUSK, GRAHAM. *Pasteur, the man.* *Science* 57: 139-141. 1923.—The author recounts many incidents in the life of Pasteur that reveal his personal characteristics. His development as a scientific worker is traced from his earliest preparation in the École Normale at Paris.—*C. J. Lyon.*

2976. RHODE, ELEANOR SINCLAIR. *The old English herbals.* *xii + 243 p., 18 pl.* Longmans, Green & Co.: London, 1922.—The author discusses and quotes freely from the Leech Book of Bald, the Lacnunga, Bartholomaeus Anglicus *De Proprietatibus Rerum*, Banckes's Herbal, the Grete Herball, and those by Turner, Gerard, Parkinson, Culpepper and Cole. A number of herbals dealing with New World plants are also discussed. The author then turns her attention to 16th and 17th century still room books. The work is concluded by a very complete bibliography of manuscript, and of early printed herbals which are the work of Englishmen, of or foreigners resident in England.—*C. W. Dodge.*

2977. WATERHOUSE, G. A. *Presidential address (including an account of some breeding experiments with the Satyrine genus Tisiphone).* *Proc. Linnean Soc. New South Wales* 47: i-xx. 1 map, 2 colored pl. 1922.—Mention is made of the two 1921 meetings of the Australian Association for the Advancement of Science at Sydney (May) and at Melbourne (August), where it was decided to publish a quarterly abstract of papers by scientific workers in Australia. Attention was called to the fact that the card catalogue of scientific and technical periodicals in the chief libraries of the Commonwealth has been completed by the Commonwealth Institute of Science and Industry. Its publication is planned.—*Eloise Gerry.*

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

ARTHUR H. GRAVES, *Assistant Editor*

(See also in this issue Entries 2969, 2972, 2974)

2978. ANONYMOUS. [Rev. of: (1) MARSHALL, C. E. *Editor. Microbiology.* 3rd ed., *xxviii + 1043 p., 1 pl.* J. and A. Churchill: London, 1921. (2) ANONYMOUS. *Laboratory manual in general microbiology.* Prepared by the Laboratory of Bacteriology and Hygiene Michigan Agricultural College. 2nd ed., *xxii + 472 p., 1 chart.* J. Wiley and Sons: New York; Chapman and Hall: London, 1921.] *Nature* 110: 694. 1922.

2979. ANONYMOUS. [Rev. of: SHANN, E. W. *First lessons in practical biology.* *xv + 256 p.* G. Bell and Sons: London, 1922 (see Bot. Absts. 12, Entry 2987).] *Nature* 110: 601-602. 1922.—The reviewer cites a number of errors.—*O. A. Stevens.*

2980. COSTANTIN, J., et F. FAIDEAU. *Histoire naturelle illustrée. I. Les plantes* [Illustrated natural history. I. Plants.] 316 p., 26 pl., 796 fig. Larousse: Paris, 1922.

2981. EBERHARDT, PH. *Précis de botanique agricole, industrielle, et médicale.* [Manual of agricultural, industrial, and medical botany.] 219 p. Challamel: Paris, 1920.

2982. KENOYER, L. A. *Plant studies for Indian high schools.* viii + 159 p., 67 fig. The Christian Literature Soc., United Provinces Branch: Allahabad, India, 1922.—“As the best way to know plants is to grow them, emphasis is placed on those avenues of approach to plant life that are open to the pupil in the school garden.”—C. S. Gager.

2983. LOWSON, J. M. *A text-book of botany.* 6th ed., 8 vo, viii + 638 p. University Tutorial Press, Ltd.: London, 1922.

2984. MARTIN, GEORGE W. *What is a plant?* Science 57: 175-176. 1923.—Dictionary definitions of the term plant are considered unsatisfactory for use in college classes in botany. The writer suggests the following: “A plant is an organism possessing chlorophyll or descended from chlorophyll-possessing ancestors.” It is recognized that this definition excludes the bacteria and in view of the possibility that they antedate distinction between plants and animals, this seems desirable.—C. J. Lyon.

2985. MOON, TRUMAN J. *Biology for beginners.* x + 558 p., 168 fig. Henry Holt & Co.: New York, 1921.—The book comprises 54 chapters, of which 14 have to do with botany, one with biology and agriculture, and one with bacteria; the remaining chapters deal with general biology and animals. Each chapter is preceded by a vocabulary of both technical and non-technical words, and is followed by a bibliography for collateral reading, and in many cases by a summary. “The course emphasizes the fact that biology is a unit science, based on the fundamental idea of evolution rather than a forced combination of portions of botany, zoology, and hygiene.”—C. S. Gager.

2986. PARKER, JOHN H. *Laboratory instruction in field crops at Kansas State Agricultural College.* Jour. Amer. Soc. Agron. 15: 43-54. 1923.

2987. SHANN, E. W. *First lessons in practical biology.* xv + 256 p., 71 fig. G. Bell and Sons: London, 1922.—This text is intended primarily for use in lower fifth forms in English schools and includes the study of both plants and animals. The illustrations have been selected to demonstrate the method of drawing in a notebook, a new feature being the introduction of drawings by the boys themselves. [See also Bot. Absts. 12, Entry 2979].—C. S. Gager.

CYTOLOGY

G. M. SMITH, *Editor*

(See in this issue Entries 3115, 3121, 3123, 3147, 3157, 3185, 3219, 3226, 3228, 3238, 3255, 3256, 3258, 3262, 3280, 3464, 3557)

ECOLOGY AND PLANT GEOGRAPHY

H. C. COWLES, *Editor*

GEO. D. FULLER, *Assistant Editor*

(See also in this issue Entries 2915, 2933, 3146, 3211, 3274, 3334, 3366, 3488, 3619)

GENERAL, FACTORS, MEASUREMENTS

2988. ANONYMOUS. [Rev. of: FLATTELY, F. W., and C. L. WALTON. *The biology of the seashore.* xvi + 336 p., 16 pl. Sidgwick and Jackson: London, 1922.] Nature 110: 540. 1922.—This book is an exhaustive summary of the known facts and “bristles with suggestions for research.”—O. A. Stevens.

2989. ANONYMOUS. [Rev. of: KENDREW, W. G. *The climates of the continents.* xv + 387 p. Clarendon Press: Oxford, 1922.] *Nature* 110: 630. 1922.—This is a well arranged, lucidly written account of the climates of the regions of the world.—O. A. Stevens.

2990. BURTT DAVY, JOSEPH. *The suffrutescent habit as an adaptation to environment.* *Jour. Ecology* 10: 211-219. 2 fig. 1922.—Accepting the hypothesis that woody plants are the more ancient and that herbaceous forms have been derived from them, it is noted that in arid portions of South Africa arborescent plants are scarce and seem largely replaced by suffrutices. It is pointed out that the climate is hostile to tree development in its dry winters, extremes of temperature, and desiccating winds, resulting in the development of grasses and other herbs and frutices. A number of the latter are from genera that normally are arborescent only. These are interpreted as possibly an intermediate stage in the evolution of an herbaceous type. A number of suffruticose species are cited and their growth-habit described, including *Parinarium capense* (Rosaceae), *Eugenia pusilla*, *Erythrina Zeyheri*, *Myrica brevifolia*, *Acacia stolonifera*, *M. elliptica*, and *Zizyphus helvola*.—Geo. D. Fuller.

2991. [C., W. E.] *Hull and the East Riding.* [Rev. of: SHEPPARD, T. Editor. *Hand-book to Hull and the East Riding of Yorkshire.* viii + 532 p. A. Brown and Sons: London and Hull, 1922.] *Nature* 110: 539-540. 1922.—It was prepared for the members of the British Association for the Advancement of Science on the occasion of their visit to Hull, in September, 1922. Nearly 300 pages are devoted to the fauna and flora.—O. A. Stevens.

2992. CHOUX, P. *Revue des travaux de botanique tropicale et subtropicale (1910-1919).* (Suite.) [Review of the work in tropical and subtropical botany (1910-1919). (Continued.)] *Rev. Gen. Bot.* 34: 547-555, 596-603, 669-675. 1922.

2993. CHUN, P. [The insectivorous plants.] Ko-Hsueh [Science—Publ. Chinese Sci. Soc.] 7: 711-716. 1922. [Text in Chinese.]—An historical review is presented of the discovery of the plants and the accounts of their physiology, anatomy, sensitivity, and ways of capturing their prey. One species each of the following families is described: Sarraceniaceae, Nepenthaceae, Droseraceae, and Lentibulariaceae.—Chunjen C. Chen.

2994. HARRIS, THISTLE. *Pseudo fulgurites.* *Australian Nat.* 5: 72. 1923.—The roots of plants form carbonic acid which partially dissolves the carbonate of lime of shell fragments in the soil thus forming rough, tube-like structures which remain after the roots decay. They are thus unlike true fulgurites formed by lightning striking in the sand.—T. C. Frye.

2995. KASSNER, C. *Die Trieblänge der Fichten und das Wetter.* [The twig length of spruce and the weather.] *Mitteil. Deutsch. Landw. Ges.* 38: 51-52. 1923.—The author gives records of growth, temperature, and precipitation at Hechingen for 1907-1920 inclusive, to show the relation between twig growth, temperature, and moisture.—A. J. Pieters.

2996. LARSEN, J. A. *Effect of removal of the virgin white pine stand upon the physical factors of site.* *Ecology* 3: 302-305. Fig. 2. 1922.—Experiments were performed in northern Idaho throughout July and August, the hottest and most critical months of the growing season, on the effect of the removal of dense virgin timbers upon air and soil temperature, humidity, soil moisture, and evaporation. One station was in uncut, 300-year-old western white pine forest; a 2nd in a recently logged white pine, hemlock, western red cedar forest with $\frac{1}{2}$ forest cover; a 3rd on land cleared in 1910 with practically no forest reproduction and no trees. The stations were only a few hundred feet apart. Temperature and humidity were taken at a height of 4.5 feet; evaporation, 6 inches above the soil surface. The air in the uncut forest was about 10°F. higher at a height of 4½ feet than in the open at night, and about 10°F. cooler during the day. Daily soil fluctuations of 4 or 5°F. at 6 inches depth occurred in the open, but only 1° in the forest, the soil being warmest in the open from 12 to 2 o'clock at night and at 4 a.m. in the forest. Evaporation was more than twice as great in the open as under timber,

being intermediate in the partly cut area. Relative humidity was similar in this respect to evaporation. Soil moisture was lowest in the virgin timber. This is probably accounted for by rainfall interception and high transpiration. Water-content at all of the stations was thought to be high enough for white pine seedlings. Their survival in cut-over areas would depend upon humidity, temperature, and rate of transpiration. Many of the evergreen species common on the floor of white pine forests had disappeared in the cleared area.—*J. E. Weaver.*

2997. NEWTON, R. Plant distribution as related to climate. *Sci. Agric.* 3: 137-142. 1922.—This is an account of the work of LIVINGTON and SHREVE [see *Bot. Absts.* 12, Entry 210.]—*T. G. Major.*

2998. SHREVE, FORREST. Conditions indirectly affecting vertical distribution on desert mountains. *Ecology* 3: 269-274. 2 fig. 1922.—Influence of altitude *per se* has yielded no conclusive results of importance from experiments by plant physiologists. The "altitude factor" includes differences of insolation, temperature, rainfall, humidity, evaporation, and a score of related conditions. Desert areas of southwestern U. S. A. furnish an excellent field for such studies because of undisturbed conditions on the mountains. Cases are described in which the variety of the earth's surface so modifies the vertical gradients of physical conditions that dissimilar communities are found at the same altitude in adjacent localities. An increase in basal elevation of 2,000 feet has pushed the pine forests upward about 1,800 feet in the Pinaleno Mountains as compared with the Santa Catalinas, orientation, character of rock and soil being almost identical. Experimental evidence points to this as caused by the ratio of evaporation to soil moisture. Different types of vegetation, e.g., desert species as compared with evergreen oak forest, are found at the same altitude, on comparing small and large mountains with the same base level. On small mountains desert species may range 900 feet higher than on larger ones with similar soil, etc. Character of rock and soil profoundly affect altitudinal range. Differences in mineralogical character of mountains similar in basal elevation and height appear to influence the vertical distribution of plants in certain cases by about 600 feet, desert plants reaching higher elevations on the volcanic soils. Some evidence is offered to show that the separate modifying influences of the mineralogical nature and total elevation are additive.—*J. E. Weaver.*

2999. T[ANSLEY], A. G. Methodology: the new Zurich-Montpellier school. [Rev. of: (1) BRAUN-BLANQUET, J. *Prinzipien einer Systematik der Pflanzengesellschaften auf floristischer Grundlage.* (Principles of a systematic plant association on a floristic basis.) *Jahrb. St. Gallisch. Naturwiss. Ges.* 57: 305-351. 1921. (2) RÜBEL, EDUARD. *Geobotanische Untersuchungsmethoden.* (Methods of geobotanical investigation.) xii + 290 p., 1 pl., 69 fig. Gebrüder Borntraeger: Berlin, 1922. (3) PAVILLARD, J. *Cinq ans de phytosociologie.* (Five years of phytosociology.) 30 p. Montpellier, 1922. (4) BRAUN-BLANQUET, J., et J. PAVILLARD. *Vocabulaire de sociologie végétale.* (The terminology of plant sociology.) 16 p. Montpellier, 1922.] *Jour. Ecology* 10: 241-248. 1922.—The leaders of the new school, some of whose names appear in the titles just cited, are the pupils of Schröter of Zurich and of Flahault of Montpellier. They lay special stress upon more accurate methods of analysis of plant associations regarded as social units and upon the concepts connected with these. The reviewer is in sympathy with the principles involved but warns against overdoing formal treatment in too early a stage of the development of plant sociology. He sees greater need of more detailed successional studies combined with investigations of environmental factors. He does not find their grouping of associations desirable. On the other hand he commends the increasing recognition of the genetic principles of the American and English ecologists.—The reviewer characterizes Rübel's work on quantitative methods in ecology as most useful and "written on broad, temperate, judicious lines with very little to criticise adversely." The final paper giving large additions to our ecological nomenclature in French and German is carefully and critically abstracted and English equivalents given for the French-German terminology.—*Geo. D. Fuller.*

3000. [TANSLEY, A. G.] [Rev. of: CLEMENTS, F. E. *Aeration and air content*. Carnegie Inst. Washington Publ. 315. 183 p., 1921 (see Bot. Absts. 11, Entry 1950).] *Jour. Ecology* 10: 122-123. 1922.—The most valuable feature of the book is the emphasis placed on the biological aspects of soil fertility. The conclusion that oil acidity in bogs is a result of deficient aeration is regarded as too simple a statement of the case, and it is thought that too little emphasis is placed on the fact that saturated soils may bear vegetation of 2 distinct types,—hydrophytic and xerophytic.—*Geo. D. Fuller*.

3001. T[ANSLEY], A. G. *Vegetation and climate in the United States*. [Rev. of LIVINGSTON, BURTON E., and FORREST SHREVE. *The distribution of vegetation in the United States as related to climatic conditions*. Carnegie Inst. Washington Publ. 284. xvi + 590 p., 73 pl. 1921 (see Bot. Absts. 12, Entry 210).] *Jour. Ecology* 10: 252-253. 1922. [See also Bot. Absts. 12, Entry 2997.]

3002. T[ANSLEY], A. G. *A large scale ecological experiment of the war*. [Rev. of: MAS-SART, JEAN. *La biologie des inondations de l'Yser et la flore des ruines de Nieuport*. [Ecology of the inundations of the Yser and the flora of the ruins of Nieuport.] 22 p., Bruxelles, 1922.] *Jour. Ecology* 10: 237-239. 1922.

3003. TANSLEY, A. G. *The structure, physiology and soil of peat plants*. [Rev. of: (1) PRIESTLEY, J. H., and MILDRED HINCHLIFF. *The physiological anatomy of the vascular plants characteristic of peat*. *Naturalist* 1922: 263-268. 1922. (2) PEARSALL, W. H. *Plant distribution and basic ratios*. *Naturalist* 1922: 269-271. 1922.] *Jour. Ecology* 10: 250-251. 1922.—These are said to be 2 preliminary papers that seem to promise a secure foundation for the development of our knowledge of the ecology of the vegetation of sour peat, a subject hitherto involved in obscurity.—*Geo. D. Fuller*.

3004. T[ANSLEY], A. G. *Maritime soils*. [Rev. of: SALISBURY, E. J. *The soils of Blakeney Point: a study of soil reaction and succession in relation to the plant covering*. *Ann. Botany* 36: 391-431. *Fig. 5*. 1922.] *Jour. Ecology* 10: 249-250. 1922.—The work is characterized as an important investigation presenting for the first time a full study, with determinations of carbonates, H-ion concentration, and organic matter of sand dune, shingly beach, and salt marsh soils in which habitat and vegetation are correlated with a high degree of accuracy.—*Geo. D. Fuller*.

3005. TROLL, WILHELM. *Über Staubblatt- und Griffelbewegungen und ihre teleologische Deutung*. [Stamen and pistil movements and their teleological significance.] *Flora* 115: 191-250. *Pl. 4-6, 1 fig.* 1922.—Within the same family (Rutaceae), the same genus (*Lopezia*), or even the same species (*Amaryllis formosissima*) the movements of stamens and pistil may be either autonomous, or induced by light or gravity. There is no evidence that these movements are to be explained on the basis of their value in the "struggle for existence."—*A. G. Stokey*.

3006. WERNECK-WILLINGRAIN, H. L. *Der Sortenbau auf Pflanzengeographischer Grundlage*. [Culture of varieties according to the principles of plant geography.] *Mitteil. Deutsch. Landw. Ges.* 37: 723-727. 1922.—In this preliminary report on an extensive study of varieties and species of cultivated plants, begun 23 years ago, the author reviews the fundamentals of plant ecology and shows how the factors controlling the distribution of wild species also operate on cultivated varieties. Several examples are given of varieties of rye to illustrate how the hygrophyl or tropophyl character of the variety determines the region in which it will succeed.—*A. J. Pieters*.

3007. YAPP, R. H. *The concept of habitat*. *Jour. Ecology* 10: 1-17. 1922.—The historical development of the concept of habitat is first discussed and then the factors, both physical and biotic, are examined. Those of the former class are divided into (1) climatic, (2) edaphic, and (3) topographic, and attention is directed to the fact that different growth-forms in the

same community are often growing in very different habitat conditions especially in a stratified community. A habitat is defined as "the place of abode of a plant, a plant community or in some cases even a group or a succession of related plant communities, together with all the factors operative within the abode, but external to the plants themselves."—In classifying habitats the author distinguishes: (1) The successional habitat,—“the changing habitat occupied by an allied group of plant associations which, as a rule, comprise the stages of a normal succession or sere.” (2) The communal habitat,—“the general habitat of any recognizable plant community, such as an association or a society.” (3) The individual habitat, “the habitat of an individual plant, whether solitary or forming part of a plant community.” (4) The partial habitat,—“the habitat of an individual plant during any given period or stage of existence.” He also expresses the opinion that in ecological research the extensive should as a rule precede the intensive and advocates cooperation in the building up of ecological reference herbaria.—*Geo. D. Fuller.*

STRUCTURE AND BEHAVIOR

3008. ANONYMOUS. **The carrot's crimson eye.** *Gard. Chron.* 72: 54. 1922.—The object of the color of this and other flowers is discussed in its relation to insect visitors.—*P. L. Ricker.*

3009. AGRELIUS, FRANK U. G. **Botanical notes for 1918-1919.** *Trans. Kansas Acad. Sci.* 30: 121-123. 1919/21 [1922].—Unusual seasonal activities, especially flowering after the usual time, are noted for 42 plants in an annotated list. Nine out of 43 twigs listed, when placed in water in the laboratory, had by April 7, 1919, started roots more or less abundantly. Further notes on polycotyledony in the castor bean and tomato are given.—*F. C. Gates.*

3010. AGRELIUS, FRANK U. G. **Botanical notes, 1919-1920.** *Trans. Kansas Acad. Sci.* 30: 234-235. 1919/21 [1922].—An annotated list is given of unusual seasonal activities of 15 plants in the vicinity of Emporia, Kansas, together with further notes on polycotyledony in castor bean and tomato.—*F. C. Gates.*

3011. AGRELIUS, FRANK U. G. **Botanical notes for 1920.** *Trans. Kansas Acad. Sci.* 30: 392-394. 1919/21 [1922].—An annotated list is presented of unusual seasonal activities in 38 plants, together with further notes on polycotyledony in tomato and castor bean seedlings. In the latter it is noted that out of 62 seed of the 1919 crop (2nd generation tricots) a ratio of about 20 : 1 obtains in comparison with the 264 : 1 ratio the previous year.—The occurrence of a cone of Austrian pine in which the upper third is pistillate and the rest staminate is noted. The specimen was preserved.—*F. C. Gates.*

3012. BAILEY, I. W. **Notes on neotropical ant-plants. I. *Cecropia angulata*, sp. nov.** *Bot. Gaz.* 74: 369-391. *Pl.* 1, 8 fig. 1922.—The author describes the anatomy of a new species of *Cecropia* found in British Guiana. It possesses simple juvenile and large palmately compound adult leaves and commonly has colonies of ants within its hollow stems. Glandular food-bodies were produced on the base of the petioles and these served as food for the colonies of Azteca ants residing within the stem. The ants also maintained within their domatia coccids, which were tended and provided much of the ants' food. Bailey decides that there is no evidence of any advantage to the plant in harboring the ant colonies and that the insect relationship is purely that of parasitism. Little or no protection seems to be afforded from the attacks of leaf-cutting ants, particularly as *Cecropia* is not colonized by the ants until it attains considerable size. The ants seem to prepare feeding places for their coccids and to be solicitous for the welfare of their eggs, larvae, and pupae. He finds no evidence whatever that the glandular food-bodies and the thin prostomata are allurements, acquired by natural selection, for the attraction of colonizing ants. The association of the ants and plants seems merely a most interesting case of parasitism by the former and shows the remarkable adaptiveness of the ants in availing themselves of the peculiarities of special environments.—*Geo. D. Fuller.*

3013. BURKILL, I. H. Annual report of the Director of Gardens for the year 1921. Straits Settlements Government Gaz. 1922, Supplement No. 79. 1922.—This is an administration report. The beetle *Prolocerus Colossus* having been troublesome, a list of the palms attacked by it is given. In the course of alterations the half of the Lake was run dry, and the mud used as filling elsewhere; the weeds which sprang up on the exposed surfaces are recorded. Some reached flowering in 65 days, others in 80 days. The 65-day plants were, *Jussiaea fissendrocarpa*, *Vandellia crustacea*, *Euphorbia aspera*, and *Panicum indicum*; and the 80-day plants, *Eleusine indica*, *Paspalum conjugatum*, *P. platycaule*, *Ischaemum Ridleyi*, *Cyperus Haspan*, *C. Irya*, *C. umbellatus*, *Kyllingia monocephala*, and *Fimbristylis aestivalis*. Seedlings of *Albizia moluccana*, germinating on the exposed lake-bed, developed bacterial tubercles upon their roots as if the bacteria existed submerged and ready to take advantage of leguminous plants should any appear; but the lake-bed is normally free from any members of the order though Leguminosae occur on its shore.—I. H. Burkill.

3014. SKIPPER, E. G. The ecology of the gorse (*Ulex*) with special reference to the growth-forms on Hindhead Common. Jour. Ecology 10: 24-52. Pl. 1, 9 fig. 1922.—The growth-forms of *Ulex europaeus* and *U. nanus* are here considered in detail both as to external and internal anatomy and the results expressed by means of drawings, graphs, and tables of measurements. The former species shows (1) the ordinary type with sun and shade variations and (2) the ericoid with short accessory branches. Both show open and cushion varieties. In *U. nanus* there are recognized 5 types: prostrate, intermediate, erect, aerial-cushion, corymbose.—The author concludes, and presents data proving, that the various parts of the different growth-forms show differences of anatomy dependent upon the degree of exposure. Thus the shade branches show more slender growth, more hairy surface, fewer but larger leaves with fewer but more efficient stomata, a thinner cuticle, and a reduced assimilatory system. The stem of the shade plant possesses a smaller proportion of xylem with a greater range in size of the conducting elements. Similar differences are found between leaves from the interior and exterior portions of the cushion forms, between those of the prostrate and upright branches and in general between the sheltered and the exposed foliage. In general the sheltered form transpires more vigorously than the exposed form, as shown by potometer experiments, although some decided exceptions are encountered. The cushion form appears to be the efficient one for reducing transpiration rate. The ericoid seems to have resulted from a less efficient conducting system, the cause of which remains for the present obscure.—Geo. D. Fuller.

VEGETATION

3015. ALLORGE, PIERRE. Les associations végétales du Vexin Français. [Plant associations of the French Vexin.] Rev. Gén. Bot. 33: 481-489, 589-652, 708-751, 792-807. 1921. 34: 71-79, 134-144, 178-191, 251-256, 311-319, 376-383, 425-431, 471-480, 519-528, 564-576, 612-639, 676-701. 1922.—The principal associations dealt with are: (1) plankton; (2) algae and mosses of running water; (3) associations submerged and floating; (4) aquatic herbs with submerged bases; (5) slimes and alluvial gravels; (6) peat bogs; (7) artificial prairie; (8) meadow and xerophilous grasses; (9) meso-hygrophilous woods; (10) mesophilous woods; (11) meso-xerophilous woods; (12) turf woods; (13) heaths and moors; (14) saxicolous; (15) corticolous; (16) murals; (17) ruderals; (18) cultivated plants; (19) mesicolous.—Because of its great edaphic diversity and its geographic position at the edge of the domain of the plains of north-west Europe and at the base of the mountains of central Europe, the French Vexin includes on a relatively small area the majority of associations recognized in western Europe, maritime associations and associations of the high mountains excepted. The phytogeographic characteristics of the French Vexin are exemplified in the Basin of Paris. In spite of the profound transformations imposed on the primitive vegetation by the influence of man, it was possible to find primitive associations. The agricultural activities of man have established highly individualized groups having all the attributes of natural associations. The introduction of foreign species compensates for the floristic impoverishment of the Basin of Paris in autochthonous species. The classic localities do not possess many of the species indicated by the ancient authors, but these species frequently occur in abundance in other localities.

When the influence of man ceases to be exercised at a given point the vegetative groups rarely reconstitute themselves in their primitive form. Cryptogamic plants show remarkable independence of human influence.—The climax mesophytic forest associations in the Atlantic climate have been destroyed or artificially restored.—*A. Hayden.*

3016. ARRHENIUS, O. A new method for the analysis of plant communities. *Jour. Ecology* 10: 185-199. *Fig. 1.* 1922.—Seeking an adequate method for analyzing the composition of plant communities the author examines those already in use and decides that Raunkiaer's is the best, although somewhat lacking in accuracy. He then describes one devised by himself in which the plant population is taken from a belt of suitable width alongside a rope marked in decimeters and meters. The vegetation is divided into an upper and a lower layer, and these are analyzed and charted separately. From the charts of the belt the frequency percentage and the number of individuals per unit area, "absolute frequency degree," are easily calculated. This latter expression permits direct comparisons between various areas even when they have been studied by different individuals, and is one of the major advantages claimed for the method. Other advantages claimed are: convenience, time saving, exact results from even a short belt, a simple expression of the closeness of the community, and a convenient means of analyzing zonation. The mass of vegetation is measured photometrically through the degree of shading.—*Geo. D. Fuller.*

3017. BARKER, E. EUGENE. A note from the Okefinokee Swamp. *Torreyia* 22: 104-106. 1922.—A party from the University of Georgia visited Okefinokee Swamp in April, 1922, and made a study of the vegetation between Billey's and Floyd's Islands. Characteristic plants, either wholly or partly submersed, belonging to 14 genera are listed.—*J. C. Nelson.*

3018. BARKER, M. M., and C. M. GIBSON. Studies of the Somerset turf moors. *Jour. Ecology* 10: 178-184. *4 maps.* 1922.—These turf moors are let out in acre or half-acre holdings for peat cutting. This cutting varies much in depth, ranging from $1\frac{1}{2}$ -6 feet. Within it 2 areas were mapped and studies initiated to answer the question of the condition of the vegetation before and after cutting and drainage were undertaken. Colonization after cutting was found to be most commonly an invasion of the weeds of cultivated lands followed by *Juncus* spp. Later *Juncus communis* and *Eriophorum angustifolium* become more abundant, to be followed by *Myrica gale*, *Molina coerulea*, and *Erica tetralix*. Different variations were found due to the depth of the peat cutting, the vegetation of the surrounding area, and the treatment (grazing, etc.) after cutting. The mapping will permit comparisons at a later date.—*Geo. D. Fuller.*

3019. CANNON, WILLIAM AUSTIN. Plant habits and habitats in the arid portions of South Australia. *Carnegie Inst. Washington Publ.* 308. *viii + 139 p., 32 pl., 31 fig.* 1921.—After an introduction in which is given a list of plants collected (49 genera and 113 species, of which *Kochia Cannoni* J. M. Black is new), the volume opens with a treatise on the physical environment of the vegetation of Australia. This presents physiographic and climatic information and is illustrated by numerous charts. A discussion of the environment, vegetation, and flora of South Australia follows, with detailed consideration of typical regions, such as those of Copley, Ooldea, Tarcoola, Port Augusta, Quorn, the mallee region, etc. Morphological aspects of the xerophytic flora of South Australia are considered, as well as certain structural features of the main perennials and some other forms. The text closes with an account of reactions and adjustments to light, temperature, low water supply, and subterranean environment. A bibliography of about 40 authors is appended.—*Burton E. Livingston.*

3020. COLLINS, MARJORIE I. On mangrove and saltmarsh vegetation near Sydney, New South Wales, with special reference to Cabbage Tree Creek, Port Hacking. *Proc. Linnean Soc. New South Wales* 46: 376-392. *Pl. 26-32, 11fig.* 1921.—The observations cover Sept., 1916, to June, 1921. This coastal area is characterized by much-branched inlets with deep water close to the shore, drowned river valleys of comparatively recent subsidence. The

region ranges from 33° 50' to 34° 5' S. Lat. Extensive areas of tidal flats are lacking since accumulation of silt is not rapid enough to keep pace with gradual subsidence. The 2 plant formations of the occurring tidal flats are discussed and an account of their developmental phases given. The 1st and outermost is mangrove formation characterized by 2 species: (1) *Avicennia officinalis*, the Australian grey mangrove, growing 15-30 feet in height. This germinates in the fetid deposits of algae, shellfish, and drift, and aids in building up the mud flat. (2) *Aegiceras majus*, a shrub which is not so constant. The leaves in early morning often bear glistening salt crystals. The roots rarely project above the surface.—The 2nd inner formation is salt marsh in which 2 associations of plants are recognized, Salicornietum and Juncetum. Development groups or associates of Salicornietum are often found in zoned arrangement according to slight differences in level. With accretion and attainment of uniform surface level, these associates mingle. Special conditions at Cabbage Tree Creek are described. Here drifting sand has been raising the level of the marsh for some years and has brought about the imposing of one formation upon another. At present the Juncetum is invading the Salicornietum, which consequently shows signs of arrested development. The occurrence of a dwarf form of *Avicennia officinalis* is recorded. In discussions and a table these tidal flats are compared with those of Great Britain and America. The Australian groupings are in general as follows: A. Mangrove formation. *Avicennia officinalis*, *Aegiceras majus*. B. Saltmarsh formation. (1) Salicornietum: (a) Salicornia-Suaeda Associates: *Salicornia australis*, *Suaeda australis*; (b) Salicornia-Spergularia Associates: *Salicornia australis*, *Spergularia rubra*, *Samolus repens*, *Suaeda australis*, *Mesembryanthemum tegens*, *Tetragonia expansa*, *Atriplex hastata* (*patula*), *Wilsonia Backhousii*; (c) Sporobolus-Cynodon Associates: *Sporobolus virginicus*, *Cynodon dactylon*, *Zoysia pungens*, other perennial halophytes. (2) Juncetum: *Juncus maritimus*, *Casuarina glauca*.—Eloise Gerry.

3021. COOPER, W. S. The broad sclerophyll vegetation of California: an ecological study of the chaparral and its related communities. Carnegie Inst. Washington Publ. 319. 124 p., 21 pl., 43 fig. 1922.—By using 6 of Adams' criteria for determining centers of distribution and by superposing the ranges of species the ecological range of chaparral is cartographically exhibited and the center of its distribution shown to lie in southern coastal California. Chaparral is dominant in the region with 10-30 inches of rainfall, and in which the precipitation of the growing season is less than 20 per cent of the annual total. The temperature extremes are moderate. In the classification of the broad-sclerophyll communities 2 formations are recognized: broad sclerophyll forest and the chaparral. Under the former are described the following associations and consociations: *Pasania-Quercus-Arbutus*, *Quercus agrifolia-Arbutus*, *Quercus agrifolia*, *Umbellularia*, *Quercus agrifolia-lobata*, *Quercus chrysolepis-kelloggii*, and *Quercus chrysolepis*. Under the latter are recognized the climax chaparral association and the conifer forest chaparral association. These communities are described with respect to their ecological characteristics and floristic content. An intensive study of structure and environmental conditions was made through portions of 2 years in the vicinity of Palo Alto and on adjacent mountains. Figures and tables depict the covering on 6 representative quadrats. Readings of precipitation were made and of soil moisture at 3 depths to 100 cm., with stations in forest and 2 types of chaparral. The roots of *Adenostoma* and *Arctostaphylos* penetrate below 100 cm., at which depth the soil moisture in mid-summer is less than 5 per cent. Soil temperature and evaporation were also measured throughout the year at 3 stations. Chaparral is conclusively shown to be the true climax vegetation for extensive areas of hill and mountain in southern California, and the contention is made that it formerly occupied much of the hill and valley land now covered by grassland or under cultivation. The root distribution, leaf anatomy, and transpiration behavior of the leading chaparral species have also been described.—Forrest Shreve.

3022. FRITSCH, F. E. The terrestrial alga. Jour. Ecology 10: 220-236. 1922.—A review is here given of the recent literature dealing with terrestrial algae. Two communities are distinguished, subterranean and surface. The former includes Diatomaceae, Cyanophyceae, and the more abundant Chlorophyceae with associated moss protonema, while in the latter the

diatoms are largely absent. The importance of the surface communities as pioneer organisms in rock and soil colonization is emphasized as well as the desirability of pursuing a branch of botanical study now in its infancy.—*Geo. D. Fuller.*

3023. GILLMAN, C. An ascent of Kilimanjaro. *Geog. Jour.* 61: 1-27. 4 pl., 2 maps. 1923.—This paper describes the physical features of the south face and states the vertical limits of the belts of vegetation: surrounding plains up to 1,100 m., xerophilous grassland; 1,100-1,800 m., agricultural land formerly tropical rain-forest; 1,800-3,000 m., tropical and temperate rain-forest; 3,000-4,400 m., alpine grass and shrubs; above 4,400 m., alpine desert and glaciers. Vegetational belts occupy lower elevations on Kilimanjaro than on Kenya on account of lower basal elevation of the former. On both mountains the vegetation is much heavier on the south face than on the north, due to greater precipitation. The belt of bamboo found above the forest on Kenya is absent on Kilimanjaro. The paper contains only brief allusions to vegetation.—*Forrest Shreve.*

3024. HOLTUM, R. E. The vegetation of west Greenland. *Jour. Ecology* 10: 87-108. Pl. 3-5. 1922.—After a review of the existing literature on the vegetation of Greenland, the topography and climate are characterized and 2 regions distinguished, separated by the parallel of 62° N. Lat. The northern division has as its climax the heath with the willow scrub as a post-climax on particularly favorable situations, and "fjaeldmark" or fell-field and moss bog as stabilized pre-climaxes. The heath is dominated by *Empetrum nigrum* and *Cassiope tetragona* with *Vaccinium uliginosum* var. *microphyllum*, *Salix glauca*, *Betula nana*, *Phyllodoce caerulea*, *Ledum palustre*, *Rhododendron lapponicum*, and *Loiseleuria procumbens* common and locally abundant. The xerarch succession abounds in mats of lichens invaded by such plants as *Lycopodium selago*, *Pyrola grandiflora*, *Carex* spp., *Saxifraga* spp., and mosses. In the hydrarch succession *Hippuris* and *Menyanthes trifoliata* are the most abundant hydrophytes with sedges dominating the later stages. The other herbaceous associations are also described. The "fjaeldmark" is an open vegetation of isolated flowering plants accompanied by mosses and lichens. It is characteristic of the extreme north and is also the type of vegetation on the nunataks. The moss bogs have cushions composed of many species among which those of *Sphagnum* never seem to predominate.—South of 62° N. Lat., within the July isotherm of 10°C., a scrub forest with trees reaching a maximum height of 4-7 m. is the climax with many of the associations already mentioned as stages in the succession. The tree species are *Betula odorata*, *Sorbus americana*, and *Alnus ovata* together with shrubby *Salix glauca* and *Juniperus communis* var. *nana*. The oceanic climate with its cool and damp summer causes the vegetation of long stretches of the coast to be very uniform in character. Mycorrhizal fungi are abundant both as endotrophic and ectotrophic forms.—*Geo. D. Fuller.*

3025. KOZŁOWSKA, ANIELA. Etude phytogéographique de la région de Miechów. [Phytogeographical study of the district of Miechów.] *Bull. Acad. Polonaise Sci. et Lettres Cl. Sci. Path. et Nat. Ser. B. Sci. Nat.* 1921: 273-286. 1921.—This article gives systematic, ecological, and historical relations of vegetation in the region of Miechów, near Krakow, Poland. In it, are characterized the typical plant associations which are due to the occurrence of various soils in this district and also due to the very interesting topography of this country. The accompanying geobotanic map illustrates the conditions. Special attention is given to the association of steppe plants which is closely connected with light conditions. In the historical section is demonstrated the development of vegetation from the glacial period to the present. All climatic changes known in the Quaternary period left traces in the district of Miechów in the form of plant relics found on the isolated calcareous rocks and in the peat bogs.—*Aniela Kozłowska.*

3026. NORDHAGEN, ROLF. Vegetationsstudien auf der Insel Utsire im westlichen Norwegen. [Studies on the vegetation of the Utsire Island in western Norway.] *Bergens Mus. Aarb. Naturv.* Raekke 1920/1921¹: 1-149. Fig. 1-37. 1922.

3027. OSMASTON, A. E. Notes on the forest communities of the Garhwal Himalaya. Jour. Ecology 10: 129-167. Pl. 8-16. 1922.—In one of the first attempts to classify on purely ecological grounds the forests of a part of northern India there is a linking made between the steppe forest of Tibet and the subtropical forests of the plains. The region under consideration ranges from 2,500 to 15,000 feet in altitude and includes over 2,500 square miles of forested lands, distributed over 4 zones, distinguished as (1) Tibetan with less than 10 inches of annual precipitation, (2) arid, with 10-15 inches, (3) dry, with 15-40 inches, and (4) moist, with 50-80 inches. Five forest formation types are distinguished, described, and divided into associations: (1) Caragana-Lonicera-Artemisia formation, within the Tibetan zone, 9,000-15,000 feet, characterized by shrubs with flexible procumbent branches and deciduous foliage, and by the absence of trees and grasses; (2) Betula-Rhododendron formation, mostly in the dry and arid zones, 9,000-13,500 feet, with more humid atmosphere than the preceding and characterized by rather dense stands of small trees and shrubs with deciduous foliage having various adaptations to retard transpiration. The most mesophytic association is the Betula-Abies, where an open upper story of *Abies Webbiana*, with a height of 60-100 feet, has below it a lower story of *Betula utilis*, 30-50 feet high, and an undergrowth of shrubby *Rhododendron campanulatum* and *Pyrus foliosa*; (3) Pinus-Cedrus formation, in the dry and arid zones, 6,500-12,000 feet, rather xerophytic in appearance, being forests of rather open stands of such conifers as *Cedrus deodara*, *Pinus excelsa*, *Cupressus torulosa*, and *Picea Morinda* together with dicotyledonous deciduous trees that sometimes form a lower story, the undergrowth varying from grasses in the more arid areas to shrubs in the moister situations; (4) Quercus-Abies formation, in the moist zone, 5,000-11,500 feet, a mesophytic forest of good height, *Abies Pindrow*, one of the chief species, ranging from 140 to 200 feet, the dominants being conifers and evergreen oaks but with secondary species largely deciduous, and epiphytic ferns and mosses abundant; (5) Shorea-Anogeissus-Pinus formation, in the moist zone, in valleys up to 6,500 feet, with a subtropical climate and a rather xerophytic aspect, a rather open forest of conifers or trees more or less leafless during the hot weather preceding the monsoon rains, the undergrowth being largely grasses. High temperature and the frequent occurrence of forest fires are factors of importance in this formation and tend to increase its xerophytism. *Pinus longifolia* is the chief tree, often in pure stands, attaining a height of 70-140 feet, and possessing thick bark, excellent coppicing powers and rapid growth while young,—characters that enable it to withstand fires. In addition to the descriptions of the formations much detailed information is contained in the characterization of the associations and in an annotated list of the principal species.—Geo. D. Fuller.

3028. RIGG, GEORGE B. The sphagnum bogs of Mazama Dome. Ecology 3: 321-324. Fig. 1. 1922.—Mazama Dome is situated in Whatcom County, Washington, at an elevation of 6,000 feet. The author visited the region in August, 1921. Bogs occur on benches near the summit, watered by rivulets from the melting snow. One of the bogs studied, typical of the vicinity, formed the south side of a pond. Here in the day time were much light and moisture as well as rather high temperature. The bog association was simple and consisted almost entirely of *Sphagnum* sp. and *Kalmia polifolia*. All the *Kalmias* seen were less than a foot in height and occurred only in the *Sphagnum* area. *Vaccinium deliciosum* was frequent in the bog and common in the vicinity. *Phyllodoce empetriformis* and *Lutkea pectinata* were abundant in the vicinity but very little of either entered the bog association. Vegetation was advancing on the pond, sedge and mosses other than *Sphagnum* being the pioneers. The bog association advances only by way of the sedge-moss association. *Sphagnum* was common in the vicinity, occurring in little patches in small, undrained places. In such places *Sphagnum* exercised no selective influence. The flora was the same as in other undrained places, some of which had mosses other than *Sphagnum*; *Equisetum*, *Carex*, and *Veratrum viride* were common in these. The possession of a distinctive flora distinguishes the *Sphagnum* bogs on Mazama Dome from the *Sphagnum* areas in the vicinity which lack a distinctive flora.—T. J. Fitzpatrick.

3029. TANSLEY, A. G. Studies of the vegetation of the English chalk. II. Early stages in the redevelopment of woody vegetation on chalk grassland. Jour. Ecology 10: 168-177. Pl.

1, 4 fig. 1922.—In 1909, 2 inclosures were made, with rabbit-proof wire, of grassland at the edge of a wood on the South Downs having areas of 820 and 390 square meters respectively. A portion of the belt of shrubs was included in each case. The woody population of these areas was studied and charted in 1909, 1914, and 1920 and the invasion of the grassland noted. The closed woody vegetation on the edge of the wood had advanced considerably, due mostly to the vegetative growth of *Rubus leucostachys*; the woody colonizers that were numerically most important were found to be *Crataegus monogyna*, *Fraxinus excelsior*, *Rosa* spp., and *Quercus robur*.—Geo. D. Fuller.

3030. [TANSLEY, A. G.] **Forest and prairie.** [Rev. of: (1) VESTAL, A. G. (1) **Local inclusions of prairie within forest.** Trans. Illinois Acad. Sci. 11: 122-126. 1918. (2) **Invasion of forest land by prairie along railroads.** Ibid. 126-128. 1918.] Jour. Ecology 10: 125. 1922.

3031. THOMPSON, H. STUART. **Changes in the coast vegetation near Berrow, Somerset.** Jour. Ecology 10: 53-61. Pl. 1, map. 1922.—The area under consideration is situated along the Bristol Channel, England, where, on account of the high tides, mud flats 4 miles in width are submerged at each tide. These flats were reported by Moss, in 1906, as without vegetation. Now from the development of a new stream tributary to River Parret an area of approximately 100 acres has become covered with vegetation most of which seems to have come in during the past 4 years. Much of this new vegetation is of the salt-marsh type showing its recent origin in the small number of species present, among which *Glyceria maritima* and *Aster tripolium* are conspicuous.—Geo. D. Fuller.

3032. UPHOF, J. C. TH. **Vegetationsbilder aus Kalifornien.** [Vegetation pictures from California.] Vegetationsbilder 14: 22 p., 6 pl. 1922.

3033. WALTON, JOHN. **A Spitzbergen salt marsh: with observations on the ecological phenomena attendant on the emergence of land from the sea.** Jour. Ecology 10: 109-121. Pl. 1, 6 fig. 1922.—A portion of a raised beach in Klaas Billen Bay is described, where the land is rising relatively fast, and a plane-table survey of the area is given in order that changes in later years may be recorded. The zonation from the tidal mud flat to the raised flat showed, (1) *Enteromorpha* with *Glyceria vilfoidea*, (2) *Bryum* sp., (3) mosses and lichens, (4) *Saxifraga oppositifolia*, *Dryas octopetala*, and *Stereocaulon paschale*, and (5) the plants of the former zone together with *Pedicularis lanata*, *Draba alpina*, *Papaver radiculatum*, and lichens. This last was on the main shingle beach. A somewhat similar zonation on silt and boulder clay was found, culminating in a more swampy type, due to an excess of soil water, in which *Salix polaris*, *Luzula hyperborea*, *Juncus biglumis*, *Polygonum viviparum*, and *Equisetum* were conspicuous. The possible climax of the shingle beach is seen in a Cassiope-heath association. The algal flora of the bay and the brackish pools also has been given some attention.—Geo. D. Fuller.

3034. YAPP, R. H. **The Dovey salt marshes in 1921.** Jour. Ecology 10: 18-23. 1922.—Data are reported of the rate of erosion of pans in a salt marsh studied in 1914. It was found to be slow and the tidal scour to be more effective than wave action. In 1914 a number of pans were artificially drained and it was found that *Glyceria* soon commenced to invade them. The amount of invasion in 1921 is recorded. In one compound pan of 594 square feet area, 387 square feet had been covered with vegetation in 7 years. The appearance of *Spartina Townsendii* is recorded as the first appearance of the plant in that part of Britain.—Geo. D. Fuller.

FLORISTICS

3035. CHRISTY, MILLER. **Primula elatior Jacquin: its distribution in Britain.** Jour. Ecology 10: 200-210. Map. 1922.—The "Bardfield oxlip" is confined in Britain to 2 districts in Cambridgeshire separated by an interval of 20 miles occupied by the River Cam. In addition there are 10 small outlying stands, both the main districts and the outlyers being on chalky boulder clay, the plant being strongly calciphilous. The conclusion is reached that the species is undergoing slow but steady contraction of its area, that this contraction is principally from

the north, that the outlying stands are remnants, and that the contraction is due in some measure to extermination through hybridization with the more potent *Primula vulgaris*.—*Geo. D. Fuller*.

3036. RITCHIE, JAMES. *Naturalization of animals and plants*. [Rev. of: THOMSON, GEO. M. *The naturalization of animals and plants in New Zealand*. $x + 607$ p. University Press: Cambridge, 1922.] *Nature* 110: 868–870. 1922.—New Zealand has presented unusual opportunity for such study since the introduced species have been widely different from the indigenous, and the time is comparatively recent, thus allowing better observation. The author “has been chary of broad generalization, and he has been at endless pains to collect and verify information, much of which in a few years would otherwise have slipped from ken.” The book treats each animal and plant in systematic order, more than 600 species of plants being recorded as having become more or less truly wild. Fifty years of close observation lead the author to state that he is “aware of no definite permanent change in any introduced species.” Some variations in size and habits are noted, however. The author sees no evidence of the native vegetation being exterminated by the introduced and holds that the former can always hold its own, though its range may be restricted. The reviewer thinks that this limitation often is only a step to ultimate extinction. On the whole, introductions in New Zealand have done more harm than good, and the reviewer suggests that nowhere should naturalization of exotic animals be permitted without the consent of a properly constituted committee containing a strong representation of biological science.—*O. A. Stevens*.

APPLIED ECOLOGY

3037. PEARSON, G. A. *Preservation of natural areas in the national forests*. *Ecology* 3: 284–287. 1922.—A movement has been launched by the Ecological Society of America to secure the preservation of natural areas where conditions may remain undisturbed by human activities. The author discusses the possibilities of the national forests of Arizona and New Mexico as affording areas to be set aside for perpetuation in their natural state. It is suggested that the formal withdrawal of certain sections of the forests under specific provisions as to future care might be accomplished.—*John W. Crist*.

3038. QUAYLE, E. T. *Possibilities of modifying climate by human agency, with special application to south-eastern Australia*. *Proc. Roy. Soc. Victoria* 33: 115–132. 1 map. 1921.—Evidence presented leads to the conclusion that the southeastern states are all under such weather conditions that they will benefit climatically by any considerable increase in surface moisture. The clearing of the land, and the institution of cultivation or pastures for the scrub forests on the inland plains cause some improvement of the rainfall, especially in spring when green growth results in vigorous evaporation. A more general improvement results from irrigation which ensures growth of vegetation throughout the year.—*Eloise Gerry*.

3039. QUAYLE, E. T. *Local rain producing influences under human control in South Australia*. *Proc. Roy. Soc. Victoria*, 34: 89–104. 1 map. 1922.—The author has previously shown for Victoria that (1) the substitution in the Mallee of crops and grass for drought-resistant forest and (2) the instituting of irrigation have a marked effect in increasing rainfall.—The conclusions made are based on the differences in mean rainfall in 1910–1919 and in 1885–1914. The areas with precipitation increased up to 15 per cent are in the lee or south-east of the cultivation or irrigation. The work on Victoria did not fully explain conditions in the neighboring area in South Australia where southeast of Lake Torrens as much as 20 per cent increase in rainfall is shown. Irrigation is negligible as a cause in South Australia, but the settlement of the country has brought about the substitution of crops and grass for the Mallee scrub and this is found to be a contributory reason. Effects are in proportion to the extent of cultivation. The increase in the water supply of the larger inland lakes and salt pans, especially Lake Torrens, is found to be of chief significance. This is attributed to the increased runoff of water at the higher levels where channels are being deepened and former pools have now vanished. Ring-barking is thought to increase the flow of water in

springs and general clearing of the land is found to make permanent flow in previously intermittent streams.—The desirability of purposely further increasing the volume of water in the lakes is pointed out. By clearing hilly land or portions of the inland foothills and mountains suitable for pasture, water which would otherwise evaporate into the air, move east or south without condensation, and so escape, may be obtained for storage in the lakes. It is believed that in the struggle for existence the perennial vegetation, with its adaptations for reduced transpiration, has exceeded its usefulness and that as a consequence gradual contraction of the belt of perennial vegetation toward the inland slopes has occurred.—*Eloise Gerry.*

3040. T[ANSLEY], A. G. Root systems of crop plants. [Rev. of: WEAVER, J. E., FRANK C. JEAN, AND JOHN W. CRIST. Development and activities of roots of crop plants. Carnegie Inst. Washington Publ. 316. vi + 117 p., 14 pl., 42 fig. 1922 (see Bot. Absts. 11, Entry 4694).] *Jour. Ecology* 10: 239-241. 1922.

FOREST BOTANY AND FORESTRY

J. S. ILLICK, *Editor*

(See also in this issue Entries 2961, 2995, 2996, 3020, 3027, 3038, 3039, 3144, 3434, 3456, 3463, 3499, 3518, 3647)

3041. ANONYMOUS. Commerce du bois. Livraison de bois par l'Allemagne. [Wood merchandizing. Delivery of wood from Germany.] *Bull. Soc. Centrale Forest. Belgique* 28: 544-548. 1921.—The Belgian Reparations Commission publishes here a letter conditioning the sale of wood furnished by Germany as reparations.—*H. T. Gisborne.*

3042. ANONYMOUS. Conseil superieur des forêts. [Superior Council of Forests.] *Bull. Soc. Centrale Forest. Belgique* 28: 470-488, 531-540. 1921.—This is a verbatim report of the meetings held on Jan. 19 and March 17, 1921, by the Superior Council of Forests to consider the proposed law for regulating certain classes of private forests.—*H. T. Gisborne.*

3043. ANONYMOUS. Les forêts sous sequestre. [Sequestered forests.] *Bull. Soc. Centrale Forest. Belgique* 28: 427-429. 1921.—A demand is made on the Senate that the government acquire all forests sequestered from alien enemies during the war.—*H. T. Gisborne.*

3044. ANONYMOUS. Loi autorisant provisoirement le gouvernement à s'opposer à l'exploitation excessive de certains bois et de certaines forêts. (Fin.) [A law provisionally authorizing the government to prevent excessive cutting in certain woods and forests. (Conclusion).] *Bull. Soc. Centrale Forest. Belgique* 28: 348-361. 1921.—This is the concluding report of the Senate discussions concerning the proposed law which was adopted, and proclaimed Jan. 11, 1921. Arguments for and against are discussed.—*H. T. Gisborne.*

3045. ANONYMOUS. Report of proceedings of the Australian forestry conference, Brisbane, April, 1922. 142 p. 1922. [See also Bot. Absts. 12, Entries 3065, 3069, 3093.]

3046. ANONYMOUS. Service des aménagements. [Forest management service.] *Bull. Soc. Centrale Forest Belgique* 28: 541-543. 1921.—This is a tabular report showing by area and districts, from 1885 to 1914, and 1914 to 1920: (1) revised management plans; (2) extent of reserved areas; (3) conversion of ruined woods into coniferous and mixed high forest; (4) conversion of coppice and standards into full high forest; (5) conversion of simple coppice into coppice and standards and into full high forest; (6) lengthening the rotation of coppice and standards; (7) lengthening the rotation of simple coppice; and (8) reducing the period of return in broad leaved high forest.—*H. T. Gisborne.*

3047. ANONYMOUS. *Tableau résumant les instructions pour la récolte des graines.* [Résumé of instructions for harvesting forest tree seeds.] Bull. Soc. Centrale Forest. Belgique 28: 463-467. 1921.—General rules for all species and separate instructions for each of 23 genera of trees are given.—*H. T. Gisborne.*

3048. ANONYMOUS. *The age of gum trees.* Jour. Dept. Agric. Victoria 19: 478. 1921.—The article deals with *Eucalyptus globulus*.—*Wm. E. Lawrence.*

3049. A., G. *Estimation d'une pineraie incendiée.* [Estimating the value of burned pine reproduction.] Bull. Soc. Centrale Forest. Belgique 28: 492-495. 1921.—This article deals with the evaluation of a stand of pine reproduction 9 years old destroyed by fire, for which the owner claims damages.—*H. T. Gisborne.*

3050. ALVIELLA, FELIX GOBLET D'. *L'impôt sur les revenus forestiers. Rapport sur l'application des lois coordonnées des 29 octobre 1919 et 3 août 1920 à la propriété boisée.* (Impôts sur le revenu.) [The tax on forest revenues. Report on the application of the coordinated laws of October 29, 1919, and August 3, 1920, to wooded (or forest) property. (Taxes on the revenue.)] Bull. Soc. Centrale Forest. Belgique 28: 399-427. 1921.—This description of the new law includes a detailed discussion by foresters of the methods of taxing the soil, the capital invested, and the revenues resulting from both regulated and unregulated forests.—*H. T. Gisborne.*

3051. ANTOINE, V. *Restauration des bois exploités pendant l'occupation.* [The restoration of woods exploited during the occupation.] Bull. Soc. Centrale Forest. Belgique 28: 451-463. 1921.—The minister of agriculture has called upon the superior council of forests to indicate the cultural, legislative, or other measures helpful in reforesting the areas denuded during the war. The article outlines the problem and the measures, obligatory and otherwise, recommended by the council.—*H. T. Gisborne.*

3052. BENCKE, ALBERT. *Die Wiederaufforstung Frankreichs.* [The reforestation of France.] Zeitschr. Forst.- u. Jagdw. 53: 692-694. 1921.—Prior to the war France imported about $\frac{1}{2}$ of its timber, today it must import at least $\frac{3}{4}$ of its supply. According to a recent estimate 26 per cent of the land area, 18 per cent of which is now forested, can grow forests. The area of state forests is only 12 per cent. The great regeneration project of 1910, never executed, is now being reconsidered along with the planting of 4 million hectares of denuded land. Several examples are cited of denuded areas successfully regenerated and made very productive.—*J. Roeser.*

3053. BENJAMIN, L. R. *Suitability of certain New South Wales eucalypts for paper pulp.* Australian Forest. Jour. 4: 369-376. 1921.—*Eucalyptus pilularis*, *E. dalrympleana*, *E. maculata*, and *E. sieberiana* were tested for suitability for paper pulp. Autoclave pulping tests indicated that all 4 species give good pulp, but that *E. pilularis* and *E. sieberiana* are apparently the most suitable.—*C. F. Korstian.*

3054. BRUSH, WARREN D. *Utilization of basswood.* U. S. Dept. Agric. Bull. 1007. 64 p., 8 pl., 7 fig. 1922.—Basswood has never been a plentiful timber. Its many uses in manufacture and its profitable disposal are fully discussed. Basswood grows rapidly, reproduces easily, and should be encouraged in the basswood region. An appendix contains a classified list of nearly 500 uses of basswood.—*J. T. Buchholz.*

3055. BUTLER, O. M. *What forestry means to southern commerce.* Amer. Forest. 28: 433-435. 1922.—Of the original stand of saw timber in the U. S. A., only about $\frac{1}{2}$ remain. Of this, 61 per cent lies west of the great plains, 23 per cent in the southern states. Proximity to the great lumber markets and the distance from a strong competing region give the south a commercial advantage unequalled in the history of American lumbering. The south's opportunity is equally great in hard and soft woods. The 9 principal factors favoring wood production in the south are discussed.—*Chas. H. Otis.*

3056. C. A propos d'un mélange d'essences. [Concerning a mixture of species.] Bull. Soc. Centrale Forest. Belgique 28: 468-470. 1921.—This article refers principally to oak stands and recommends mixing beech rather than spruce with oak.—*H. T. Gisborne*.

3057. DENZIN. Die Ergänzungen zur Betriebsregelungs-Anweisung für die preussischen Staatsforsten. [Supplementary instructions of the management-plan instructions for the Prussian state forests.] Zeitschr. Forest.- u. Jagdw. 53: 517-542. 1921.—This critical discussion of the instructions points out the many ways in which they make the work of the official unnecessarily difficult.—*J. Roeser*.

3058. DRUMAU, L. Le mélèze du Japon en Hollande et en Belgique. [Japanese larch in Holland and Belgium.] Bull. Soc. Centrale Forest. Belgique 28: 507-519. 1921.—This recounts the growth of *Larix leptolepis* in Holland, where it has been grown since 1906, and in Belgium, where stock was set out in 1907. Complete measurements of average trees at ages of 15 and 18 years are given.—*H. T. Gisborne*.

3059. DUTT, SHAMBHOO. Annual report on the forest administration in Ajmer Merwara for the year 1918-19. 30 p., Ajmer, 1920.—This report covers in detail the work of the Forest Department in one of the smaller Indian Forest districts. It gives the forest area, lists forest offenses, discusses fire protection and shows the kind of produce taken from the forests. Due to severe drought most of forest area was opened to grazing. The drought did damage to timber, and natural reproduction was poor. A summary for period 1914-15 to 1918-19 is included.—*S. B. Show*.

3060. DUTT, SHAMBHOO. Annual report on the forest administration in Ajmer Merwara for the year 1919-20. 29 p., Ajmer, 1921.—This report discusses forest offenses, forest income, fire protection, and grazing. A severe frost did great damage to trees and especially to reproduction. Experiments in planting, in growing spineless cactus, in development of lac, and in tapping of salar for gum are considered.—*S. B. Show*.

3061. EBERBACH. Die beste Bestandsform und das beste Einrichtungsverfahren? [The best silvicultural form and the best plan of management?] Zeitschr. Forst.- u. Jagdw. 53: 466-474. 1921.—Eberbach replies to Eichhorn's critique of his Ordnung der Holznutzungen, which appeared in 1913. The author defends his advocacy of regular measurement and of inventory as necessary business, of the abolition of rotation and of distinction between final and secondary yields, and his method of calculating the increment.—*J. Roeser*.

3062. ESCHERICH, K. Die Streufauna. [The fauna inhabiting forest litter.] Forstwiss. Centralbl. 44: 23-29. 1922.—It is of great importance to foresters to understand the nature of the animal life in the forest litter, and its detrimental and beneficial effects on the stand. Pillai's automatic method of separating the animals from the litter is described, and a long list is given of genera found in the litter from conifer forests, some kinds being abundant, others occasional. Seasonal differences are striking; in June there are fewer than in May; the number rises again in July, falls in September, rises in October, and falls in December. The fluctuation is greater, as is also the number of insects, in older stands. Preliminary results show that removal of the litter upsets the natural balance by removing many useful insects, and thereby favors the activities of noxious species.—*W. N. Sparhawk*.

3063. GEIST. Welchen Einfluss hat ein zu tiefer stand der Kiefer auf deren Lebensdauer und Ertrag? [What influence has too deep setting of pine upon its longevity and yield?] Zeitschr. Forst.- u. Jagdw. 53: 690-692. 1921.—This is a study of a sample plot of 0.2 hectare having a stand of pure 54-57 year old pine, started by sowing seed in plow furrows. The side roots were laid bare and their number and depth determined for all diameter classes. The results show the danger of deep furrows and the value of securing shallow rooting, and of manuring with raw humus. They indicate that deep underplowing of the raw humus and

deep setting of trees in plant slits are very dangerous in dry sandy soils; also that thinnings in the lower story only should be made with plow furrows or spot cultures (Platzekulturen), advance growth to be cut out only when diseased or badly formed.—*J. Roesser*.

3064. GILL, A. J. Bushfire brigades. Jour. Dept. Agric. Victoria 19: 690-691. 1921.—The author discusses methods of fire fighting and recommends growing maize and potato crops in the more dangerous situations.—*Wm. E. Lawrence*.

3065. GILL, WALTER. History of the development of the South Australian *Pinus insignis* forests. Proc. Australian Forest. Conference, Brisbane 1922: 26-28. 1922.—The introduction of and ultimate returns from these plantations are discussed.—*C. F. Korstian*.

3066. GLORIE, H. La forêt de Houthulst (fin). [The forest of Houthulst (conclusion).] Bull. Soc. Centrale Forest. Belgique 28: 335-339. Pl. 1-4. 1921.—This is the concluding article on the documentary history of this forest.—*H. T. Gisborne*.

3067. GOUDIE, H. A. Eucalypts in New Zealand. New Zealand Jour. Agric. 24: 229-235, 1922.—Various species of *Eucalyptus*, well suited for afforestation purposes in New Zealand, are described. Care should be taken to select desirable species.—*N. J. Giddings*.

3068. HARTMANN, FRANZ. Über das Kohlensäureproblem im Walde. [On the carbon dioxide problem in forests.] Wien. Allg. Forst.- u. Jagdzeitg. 40: 43-45. 1922.—This article supports the view that carbon dioxide concentration is of great importance in forest growth, based upon the facts that the average carbon dioxide concentration of 0.03 per cent is far below the optimum, that an increase of only 0.01 per cent results in stimulated growth, and that the favorable effect is not limited to vegetative growth but extends to seed production. Proof that vigor of growth is dependent upon carbon dioxide content of the air is difficult, for the same factors of moisture, warmth, and litter accumulation which are most favorable to carbon dioxide production are likewise undoubtedly favorable to tree growth. The well known unfavorable effects of undergrowth in forests are claimed to be due to the absorption of the carbon dioxide rising from the ground before it reaches the crowns of the forest trees.—*F. S. Baker*.

3069. HAY, R. DALRYMPLE. Silvicultural and conversion work in New South Wales. Proc. Australian Forest. Conference Brisbane 1922: 82-85. 1922.—This is a brief account of progress made in the forestry commission's work in the management and reestablishment of indigenous forests in New South Wales.—*C. F. Korstian*.

3070. HELMS, A. Plantations in New South Wales: Factors influencing spacing. Australian Forest. Jour. 5: 11-13. 1922.—The author discusses the effects on shape and growth of individuals in the community, caused mainly by the quantity of light available, and development caused by internal individual characteristics, some species showing a greater form variation than others.—*C. F. Korstian*.

3071. HISS. Die beste Bestandsform und das beste Einrichtungsverfahren. [The best forest-form and the best working plan experience.] Zeitschr. Forst.- u. Jagdw. 53: 636-641. 1921.—This is a reply to Eichhorn's critique of Eberbach's booklet "Aus dem Walde," [see Bot. Absts. 11, Entry 2363]. The present management methods are based on the cameralistic conception, founded on a theory of the ultimate performance of the forest. Eberbach's book is the 1st German attempt to prepare a plan based on biological conceptions, or on facts. The forest condition at the beginning and end of every working plan period is the foundation for these methods; the scale which measures the result is the running increment (secured by a stem-to-stem inventory of the growing stock). The biological method is applicable to all forest forms.—*J. Roesser*.

3072. HOWARD, S. H. Volume tables and form factors for sal (*Shorea robusta*) 8 p. Calcutta, 1922.—These are preliminary tables based on the measurement of 817 trees. A discussion of the tables and the various derived figures is included.—S. B. Show.

3073. JANACZEK. Beobachtungen anlässlich der Barkenkäferbekämpfung 1921. [Observations on the barkbeetle attack of 1921.] Wien. Allg. Forst.- u. Jagdzeitg. 40: 79-81. 1922.—This article discusses fully a destructive outbreak of the bark beetle, *Ips typographus*. The best remedy is to cut and peel trees containing the larvae. The trap tree system is effective. The bark must be burned. Burying 40 cm. deep as an alternative proved ineffective. Careful disposal of slash and tops especially in areas of snowbroken and windfallen timber, is the best preventive measure. "Natural" management, a selection system, and avoidance of clean cutting and planting systems is advocated as a means of maintaining a healthy forest.—F. S. Baker.

3074. KARITZKY. [Rev. of: MARTIN, H. Die Fortbildung des sächsischen Forstentwicklungsverfahren. (The development of the Saxon forest organization.) 154 p. Paul Parey: Berlin, 1920.] Zeitschr. Forst.- u. Jagdw. 53: 434-439. 1921.

3075. KECK. Dauerwald und Grossbetrieb. [The continuous forest and extensive operations.] Zeitschr. Forst.- u. Jagdw. 53: 632-636. 1921.—In 1908-1910 the forest range of Gertlauken, one of the Lithuanian loam ranges, was seriously damaged by the nun-moth (*Liparis monacha*). The stand consists of spruce in mixture with broad leaf species. The author practiced a form of continuous management under a new plan based on regulation by volume instead of area distribution of age classes. Regeneration secured naturally was supplemented by some planting. Birch and aspen were encouraged in mixture, because of their relative importance at the time. The forest administration, the wood buyers, and the trade accustomed themselves to the distribution of the harvest over the whole area, which was the most difficult factor in the continuous system.—J. Roeser.

3076. KIENITZ, M. Wuchsleistung eines 40-jährigen Bestandes von Douglastannen. [Growth performance of a 40-year old stand of Douglas fir.] Zeitschr. Forst.- u. Jagdw. 53: 573-575. 1921.—In 1883, 828 sq. m. in the Chorin forest nursery were planted with alternate rows of 2-year old Oregon Douglas fir and 4-year old nursery grown Norway spruce, with occasional rows of linden. The spruce, soon outgrown, was gradually removed for Christmas trees. No thinning was necessary in the Douglas fir until 1920, when the average breast height diameter was 27.94 cm., and 119.69 cm. were removed in thinning. The fear that Douglas fir and other western American trees will finally fail in Germany even after a good start is not altogether justified. Regardless of the future of Douglas fir stands, their rapid growth and large early yields on fresh loamy soils warrant abundant planting and cultivation, preferably in mixture with spruce.—J. Roeser.

3077. KÖNIG. Hacken und Behäufeln. [Hoeing and hilling.] Zeitschr. Forst.- u. Jagdw. 53: 429-430. 1921.—Although the hoeing of pine cultures has been done with success, it has not yet found general usage as it has in oak cultures. In order to obtain the maximum effect, hoeing must be done at the beginning of the regular pre-summer drought as soon as the soil has lost its superficial porosity. The hilling of pine cultures, unlike that of field crops and oak is not beneficial and may even be detrimental. More research work is desirable in the forestry phase of hoeing.—J. Roeser.

3078. LEGAT, C. E. Annual report of the forest department for the year ended 31st March 1920, including report on railway sleeper plantations for the same period. Ann.Rept.Forest Dept. Union South Africa 31 p. 1920.—This report discusses the operations of the Department under the following headings: Extension and Constitution of State Forests, Management of State Forests, Financial Results, Administration, Staff, etc. Progress is reported in preparing working plans and in collecting growth and yield data. Silviculture is treated under the

headings: Natural Reproduction, Artificial Reproduction, Drift Sand Operations, Artificial Reproduction in the Indigenous Forests, Cultural Operations, Nurseries and Sales of Seeds, Operations for Improvement of Growing Stocks and Silvicultural Notes. The revenue for the year amounted to slightly more than £131,976, which is 54.6 per cent of the total expenditure. Investigations were initiated as to seasoning and preserving timber.—*C. F. Korstian*.

3079. MADDOX, R. S. Directions for planting black locust [seed], seedlings and sprouts. Tennessee Forest. Bur. Circ. 3. 8 p. 1922.

3080. MADDOX, R. S. Forest fires and your home. Tennessee Forest. Bur. Circ. 1. 4 p. 1922.

3081. MADDOX, R. S. Forests, gullies and reconstruction. Resources of Tennessee 9: 23-31. 1919.—This article gives a brief description of present forest conditions in Tennessee, the causes of and injuries from gullies, and methods of reclamation. The construction of cheap dams of brush is recommended. It is usually desirable to plow off the banks, so the dams may catch the soil more rapidly. The establishment of a vegetative cover is considered. Black locust, Bermuda grass, and honeysuckle vines have so far proved the most successful soil binders.—*C. F. Korstian*.

3082. MARCHET, JULIUS. Das Forstwesen im Österr. Landeskulturförderungsgesetz. [Forestry in the Austrian agricultural appropriation law.] Wien. Allg. Forst.-u. Jagdzeitg. 40: 49-50. 1922.—The new law makes an annual appropriation for the next 10 years for forestry purposes, which include education and farmers' conferences; promotion of societies and associations; forest workingmens' affairs; animal production, pasture and grazing development; horticulture; forestry proper; watershed protection and torrent control; flood patrol and control. The appropriations are well planned, but gives pure forestry a rather small share of the total.—*F. S. Baker*.

3083. MARCKWORTH, GORDON D. How forest fires damage the cattlemen. Tennessee Forest. Bur. Circ. 2. 8 p. 1922.—This is a popular leaflet refuting the fallacious argument that forest fires improve the range.—*C. F. Korstian*.

3084. NECHLEBE, A. Das forstliche Versuchswesen in der Tschecho-slowakei. [Forest research in Czecho-slovakia.] Wien. Allg. Forst.- u. Jagdzeitg. 40: 169, 175. 1922.—The necessity for a forest experiment station was emphasized during the nun-moth outbreak of 1917-18. It has now been decided to establish a research force in Czecho-slovakia under 3 heads; one division will specialize on moth control work, the other 2 on silviculture and economics respectively. It is hoped that these may be independent establishments, connected neither with schools nor agricultural experiment stations.—*F. S. Baker*.

3085. PETRIE, W. R. Tarrietia argyrodendron (Crow's foot elm or brown oak). Australian Forest. Jour. 5: 9-10. 1922.—The author gives brief silvicultural notes on seed production, germination, and seedling growth.—*C. F. Korstian*.

3086. POSKIN, A. Observations sur les semences forestières. [Observations on forest tree seeds.] Bull. Soc. Centrale Forest. Belgique 28: 387-398. 1921.—Results of experiments in storing forests tree seeds by various methods for from 3 months to 6 years are given. The conclusion is reached that "the preservation of forest tree seeds in air-tight containers at low temperatures should be tried by practitioners."—*H. T. Gisborne*.

3087. Q., C. J. Estimation d'une pineraie incendiée. [Estimating the value of burned pine reproduction.] Bull. Soc. Centrale Forest. Belgique 28: 552-553. 1921.—The author comments on the methods in a previous article (Sept. 1921), [see Bot. Absts. 12, Entry 3049] concerning the evaluation of a 9-year-old stand of pine reproduction destroyed by fire.—*H. T. Gisborne*.

3088. R., E. *Pineraies de Campine. Eclaircies.* [Thinnings in the pine woods of Campine.] Bull. Soc. Centrale Forest. Belgique 28: 345-347. 1921.—Thinning *Pinus sylvestris* at Campine is described.—*H. T. Gisborne.*

3089. REGINSTER, G. *Excursion forestière en 1920.* [The 1920 excursion of the Society of Belgian Foresters.] Bull. Soc. Centrale Forest. Belgique 28: 519-531. Pl. 1-2. 1921.—This is a detailed description of the forest of Hertogenwald, comprising 11,250 hectares.—*H. T. Gisborne.*

3090. RUZETTE. *Project de loi relatif à la protection de certains bois et de certaines forêt appartenant à des particuliers.* [Proposed law relating to the protection of certain woods and forests in private ownership.] Bull. Soc. Centrale Forest. Belgique 28: 339-344. 1921.—This article shows the necessity for and the justification of a law preventing the devastation of certain classes of privately owned woodlots and forests. The text of the law as passed Jan. 11, 1921 is given.—*H. T. Gisborne.*

3091. SCHRÖDER. *Eindrücke aus dänischem Walde.* [Impressions from Danish forests.] Zeitschr. Forst.- u. Jagdw. 53: 430-434. 1921.—Beech (*Fagus sylvatica*) comprises $\frac{2}{3}$ of the forest area of Denmark. Regeneration is secured by sowing in mast years, or by planting 2-year-old seedlings during non-mast years under a very light shelter of old trees, after very intense soil preparation. This system can not be practiced in Germany, because of poorer soil and the danger of frosts, which demands a heavier shelterwood. The Danish method of heavy thinnings in early age would be unfavorable on most German sites and would lead to the formation of poorly shaped boles whose volume increase would not offset the decrease in value.—*J. Roeser.*

3092. SEEHOLZER. *Saumfemelschlag und Blendersaumschlag.* Forstwiss. Centralbl. 44: 125-137. 1922.—Seeholzer explains the distinction between the Bavarian "Saumfemelschlag" and Wagner's "Blendersaumschlag." Characteristic of both are mixed stands, natural reproduction, progressive cuttings in successive strips on the border of the stand, segregation of age-classes, restriction of cutting to small areas, and maintenance of overhead cover. Wagner's method, however, is more or less schematic, requiring cutting in regular parallel strips, whereas the Bavarian method, which leaves the shape and amount of the cut entirely to the forester, is generally characterized by great irregularity in the border strip which is cut over each time. The "Femel" cutting in general is entirely distinct from the "Plenter" (selection) form and the "Schirm" (shelterwood) form. Under a true selection method the stand is never removed, while under the clear cutting (Kahlschlag), shelterwood (Schirmschlag), and Femelschlag methods the stand is removed in one or several operations and replaced by a new one. In these the stand is the unit of management, while with selection cutting the individual tree is the unit. Wagner's method is incorrectly named, because it does not result in a selection forest (Plenterwald).—*W. N. Sparhawk.*

3093. SIMON, M. H. *The financial bases of silviculture and agriculture.* Proc. Australian Forest. Conference, Brisbane 1922: 129-130. 1922.—A comparison is made between agriculture and forestry on "scrub" land in Queensland. The original crop should be realized on to the fullest extent prior to the launching of silvicultural operations having in view the reforestation of an area. Objection is raised to deducting revenue from the disposal of the old crop for the cost of planting the new crop.—*C. F. Korstian.*

3094. STÅLFELT, M. G. *Till Kännedomen om Förhållandet mellan Solbladens och Skuggbladens Kolhydratsproduktion.* [Relation between carbohydrate production of sun leaves and shade leaves.] Meddel Statens Skogsförsöksanst. 18: 221-280. Fig. 1-16. 1921.—Tests were made with leaves of *Acer platanoides*, *Pinus sylvestris* and *Picea excelsa*. In the 1st, sun leaves exhibit much higher photosynthetic activity than shade leaves. Thickness of the leaf as well as area must be considered, as thick leaves produce more carbohydrate than

thin. Considering the mass of tissue involved, leaves of medium thickness are most efficient. When exposed to the same light intensity both sun and shade leaves of pine show higher photosynthetic activity than those of spruce. In nature, the spruce makes up for this deficiency by a greater mass of needles. Spruce is able to persist in much less intense light. In both pine and spruce assimilation increases with light intensity, attaining maximum activity in full sunlight. Broadleaf trees generally attain maximum output of carbohydrates in medium light intensities. This difference is attributed to the fact, shown by Lubimenko, that pine and spruce needles contain a relatively low proportion of chlorophyll. The same limitation apparently renders pine and spruce unable to respond to increases over the normal proportion carbon dioxide in the atmosphere. Shade leaves of both pine and spruce are relatively more efficient than sun leaves in a given light intensity, which is explained by the higher chlorophyll content of the shade leaves. Assimilation is strongly dependent on soil moisture. During a protracted drought in June and July, when transpiration was reduced to within 12 per cent of normal in spruce and to a somewhat higher figure in pine, assimilation practically ceased in the former and fell to a very low figure in the latter. After heavy rains both transpiration and assimilation rose abruptly. The cessation of assimilation is attributed to the closing of the stomata in order to check water loss. (Summary in German).—*G. A. Pearson.*

3095. STOATE, T. N. **Silvicultural notes: *Pinus insignis* VIII.** Australian Forest. Jour. 5: 8-9, 75-76. 1922.—The author discusses protection against atmospheric agencies and grazing animals, rabbits, hares, wallabies and wombats, deer, bandicoots, mice, and birds.—*C. F. Korstian.*

3096. STUBENRAUCH. **Forstliche Plauderei. [Forest gossip.]** Zeitschr. Forst.- u. Jagdw. 53: 406-423. 1921.—Problems causing most contention in forestry concern the care of forest stands through thinnings and the natural and artificial establishment of such stands. Volume calculation based on light thinnings and increment as influenced by fertility are considered. Light thinnings in uneven-aged stands under continuous management and in even-aged stands are discussed. The even-aged forest is a better producer of quantity and quality than other forest forms. The determination of the financial rotation under the present Prussian management is also discussed.—*J. Roesser.*

3097. TRESCKOW, VON. **Forstwirtschaftlicher Rückblick auf die Jahre 1919/1920. Review of forest economics for the years 1919-20.** Zeitschr. Forst.- u. Jagdw. 53: 581-616. 1921.—The author considers the economic situation, its effect on the wood market and on building operations, state forest management and exploitation, the depressing import possibilities from neighboring states, questions of organization, legal provisions, and silvicultural questions, such as the argument over the relative merits of systems occasioned by Möller's "continuous management" in pine, and the bettering of the structure of forest organization. Heavy inroad into the growing stock will be necessary, but this should be counterbalanced by replacement, cultivation, and increasing production.—*J. Roesser.*

3098. WILBRAND. **Der wilde Kirschbaum. [The wild cherry tree.]** Zeitschr. Forst.- u. Jagdw. 53: 641-644. 1921.—The great demand for fuel has led to the reduction of many tree species, notably the wild cherry, which, after walnut, is the most important and desirable furniture wood. The wild cherry regenerates easily, is very tenacious, and individual trees of 185 and 172 cm. breast height diameter have been measured, the former in close association, with, but not suppressed by, a 264 cm. oak. The wild cherry should be brought back by natural and artificial means because of its timber value and aesthetic value, and its fruit.—*J. Roesser.*

3099. WILBRAND. **Staatliche Forstgesetze und der Grosswaldbesitz. [State forest laws and ownership of large forests.]** Zeitschr. Forst.- u. Jagdw. 53: 542-553. 1921.—To prevent destruction of private forest lands and to secure unified organization, state laws and super-

vision are desirable. A plan is outlined for state control of the personnel and management of large private forests, especial emphasis being given to the regulation of the yearly cut and adherence to the limitation. Using statistics from Hessian forest management, Chr. Müller, opposed to state control, shows that the income from private forests is greater than from state forests. This is due, primarily, to a greater production cost and a larger unit outlay for roads in the state forests. The author contends that the state is looking ahead by making salvage cuttings, getting rid of unproductive material, and spending liberally and wisely for artificial restocking.—*J. Roesser.*

GENETICS

ORLAND E. WHITE, *Editor*

(See also in this issue Entries 2915, 2917, 2918, 2922, 2938, 2946, 2947, 2949, 2954, 2977, 2990, 3005, 3011, 3035, 3036, 3304, 3306, 3312, 3313, 3318, 3347, 3349, 3350, 3417, 3431, 3435, 3470, 3581, 3599, 3606, 3613, 3619)

3100. ANONYMOUS. A new *Dahlia* of interest to plant breeders. *Jour. Heredity* 11: 48. 1920.—This new *Dahlia*, *D. Popenovii*, is thought to be the ancestor of the cactus-flowered *Dahlias*.—*Edith Lang.*

3101. ANONYMOUS. Cross fertilization of wheat. *New Zealand Jour. Agric.* 24: 88-89. 1922.—The possible effect of slight frost injury to stamens, as related to cross fertilization, is discussed.—*N. J. Giddings.*

3102. ANONYMOUS. The inheritance of size. *Nature* 110: 463. 1922.—This general review of recent experiments indicates that size inheritance is due to independent multiple factors. Hybrid vigor increases the size of the 1st generation following a cross. Measurements of rabbits, subsequent to the crossing of races of divers sizes, support the conclusion that size is controlled by general growth factors which are correlative in effect; while certain species crosses in *Oenothera* illustrate that size factors, local in effect, occur in plants. The presence of non-inherited size differences has been demonstrated with the deer-mouse.—*H. W. Feldman.*

3103. ANONYMOUS. [German rev. of: BECKER, J. *Grundlagen und Technik der gärtnerischen Pflanzenzüchtung*. (Principles and technique of horticultural plant breeding.) 400 p., 149 fig., 17 col. pl. Paul Parey: Berlin, 1922.] *Zeitschr. Pflanzenzücht.* 8: 445-447. 1922.

3104. ANONYMOUS. [Rev. of: MENDES CORRÊA, A. A. *Homo* (Os modernos estudos sobre a origem do homem.) (Man: Recent studies on the origin of man.) 318 p. Lumen Empresa Internacional: Lisboa, Porto, Coimbra, 1921.] *Nature* 110: 510. 1922.

3105. ANONYMOUS. [German rev. of: PRITCHARD, F. *Development of wilt resistant tomatoes*. U. S. Dept. Agric. Bull. 1015. 18 p., 10 pl. 1922 (see Bot. Absts. 11, Entry 2893).] *Zeitschr. Pflanzenzücht.* 8: 436. 1922.

3106. ANONYMOUS. [German rev. of: SALAMAN, R. and J. LESLEY. *Genetic studies in potatoes; sterility*. *Jour. Agric. Sci.* 12: 31-39. 1 fig. 1922.] *Zeitschr. Pflanzenzücht.* 8: 439. 1922.

3107. ANONYMOUS. [German rev. of: WECK, R. *Über Bewertung bei Selektionsarbeiten*. [The value of selection.] *Fühling's Landw. Zeitg.* 71: 134-139. 1922.] *Zeitschr. Pflanzenzücht.* 8: 444. 1922.

3108. ANONYMOUS. [Rev. of: WERTH, E. *Der fossile Mensch; Grundzüge einer Palä-anthropologie*. Erster Teil. (Fossil man: Basis of paleo-anthropology. Part 1.) iv + 336p. Gebrüder Borntraeger: Berlin, 1921.] *Nature* 110: 508-509. 1922.—The author depends

largely upon the methods and conclusions of Schwalbe and Klaatsch. No mention is made of remains found at Piltown, Boskop, Talgai, or Wadjak, but full accounts are given of 2 discoveries in Germany during war-time,—one at Ehringsdorf, near Weimar, the other at Ober-cassel near Bonn. The former is rightly attributed to Neanderthal man and the latter is regarded as Cromagnon.—*O. A. Stevens.*

3109. ANDERSON, E. G. **Heritable characters of maize XI—Fine streaked leaves.** Jour. Heredity 13: 91-92. 2 fig. 1922.—A number of maize plants grown in 1917 showed fine white streaks in the leaves, somewhat resembling the lineate leaves described by Collins and Kempton. These cultures were closely related. Out-crosses with unrelated green plants gave normal green plants in the F_1 , and less than 25 per cent streaked plants in the F_2 . The factor for fine-streaked leaves is apparently linked with that for white endosperm, as no yellow seeds ever produced fine-streaked plants.—*R. C. Cook.*

3110. ANDERSON, W. S. **Sterility in relation to animal breeding.** Kentucky Agric. Exp. Sta. Bull. 244. 201-234. 1922.—Many farms within a radius of 25 miles of the Kentucky Experiment Station are devoted to raising 1 of the 3 breeds of light horses or some other breeds of registered stock. A study of sterility of male and female breeding animals has been conducted during the past 9 years.—I. Sterile males. Microscopic examination of semen and results of matings were used in determining fertility of males. A complete lack, a decreased number, or reduced vigor of motion of spermatozoa, or admixture of pus cells with spermatozoa are all indications of sterility. In some instances a male may at first discharge semen entirely free from spermatozoa but on a second mating a few minutes later discharge perfectly normal semen. Nineteen examples of sterile males are given which represent the types of male sterility worked with: (1) fibroid degeneration of the testes; (2) repeated attacks of orchitis; (3) production of a large percentage of inactive sperms; (4) presence of pus in the semen due to an inflammation of some portion of the genital tract. Proper feeding and exercise has resulted in some sterile males again becoming fertile.—II. Sterile females. Less than half the mares bred in Kentucky in any year raise foals to maturity the next year. Some of the causes of barrenness in mares and jennets are: (1) breeding at the wrong period of heat; (2) abnormal discharges in the female tract resulting in rapid inactivation of the sperms; (3) irregular heat periods due to inflammation and final destruction of the ovaries; (4) indifferent mares or mares which fail to catch at the first mating may pass 2 or 3 periods without showing signs of heat, possibly due to physiological conditions resulting from the care of foal. It is good practice to breed a mare that has just foaled, on the 7th and 9th or on the 8th and 10th days after foaling.—III. Artificial insemination. Methods are described of collecting semen. It is not safe to extract semen from a served mare for use with another mare because of the possibility of transferring disease. Usually it is not satisfactory to divide the discharge of a male between 2 or more females as in doing so the chances of a successful mating are reduced. The chief value of the syringe is to catch all available semen and inject it into the female. This method has proved the most efficient yet devised to insure the impregnation of a valuable brood mare.—*W. D. Valleau.*

3111. ANDERSON, W. S. **The effect on the germ plasm of isolation in a mountain section.** 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics, and the family. 297-302. Williams & Wilkins Co.: Baltimore, 1923.—Two families about 100 years ago took possession of a broken and unproductive strip of land in the foot-hills of the Kentucky mountains. One family was afflicted with chorea, the other family was feeble-minded. The 2 families have intermarried; now in the 5th generation there are about 150 families. In $\frac{3}{4}$ of these families there is chorea in some form or other. The disease has become intensified with each new generation owing to isolation which has encouraged cousin marriages. The feeble-minded tendency of the original stock seems also to have been intensified by the same intermarriages and the present generation has less energy, ambition, and ability than any of the previous generations. The most unfortunate feature of the affliction is the early and severe onset of the chorea as it has been manifest in the last 2-3 generations, in some instances appearing in childhood or in early

manhood, and in some of these cases assuming the form of complete mental irresponsibility along with the customary lack of muscular control. As a whole the women are very productive although the primitive conditions under which they live and the lack of care exercised by the mentally deficient mothers causes a very large infantile death-rate.—*W. S. Anderson.*

3112. BAGG, HALSEY J. Disturbances in mammalian development produced by radium emanation. 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 150-167. Williams & Wilkins Co.: Baltimore, 1923.—Two groups of female white rats were treated. In 1, the animals were injected intravenously or subcutaneously at varying periods before and after mating, with solutions of the active deposit of radium emanation. The usual dose was 5 millicuries. In the 2nd group pregnant females at nearly full term were treated with gamma-ray radiation from an amount of radium emanation equivalent to about $1\frac{1}{2}$ gm. of radium metal. The source of radiation was placed 1 cm. from the ventral body wall of the animal, and 2 mm. of lead and 1 mm. of silver were used as a filter. Doses of about 1,300 millicurie hours were used in this group. The results for the intravenous or subcutaneous treatments were similar, as shown by the arrested development of the foetus. Following treatment after mating, many embryos were killed and absorbed, or aborted. Many other effects are detailed. It would seem that by treatment of the mother before mating the faculty of the later developing embryo to form proper blood vascular endothelium is interfered with. When pregnant females at nearly full term were irradiated with gamma rays approximately $\frac{1}{2}$ of the young of each litter died 10 days after the treatment. The condition and symptoms of the young are described. Interesting developmental arrests were noted in the other half of the litters that survived the treatment. Although the animals grew to normal size, they soon showed abnormal eyes, with opaque pupils and the entire organ generally deformed. The abnormal animals were sterile in both sexes. They showed no neurological disturbances, and yet at autopsy marked developmental arrests were noted in the differentiation of the brain. The neopallium was greatly reduced in some cases and the cortex largely missing in others. The gonads of these animals were greatly atrophied and degenerated, although the other viscera showed no pathological changes.—*Halsey J. Bagg.*

3113. BANKER, HOWARD J. The ideal family history. 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 306-311. Williams & Wilkins Co.: Baltimore, 1923.—The author argues for a centrifugal type of family-history study as the only form based on correct biological principles and supplying the greatest interest to the greatest number of the family.—*Howard J. Banker.*

3114. BANKER, HOWARD J. The learned blacksmith—an aristogenic type. 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 340-347. Williams & Wilkins Co.: Baltimore, 1923.—A pedigree study is reported of Elihu Burritt showing the incidence of intellectual ability in his family network.—*Howard J. Banker.*

3115. BANNIER, J. P. [Dutch rev. of: TÄCKHOLM, GUNNAR. Zytologische Studien über die Gattung Rosa. (Cytological studies on the genus Rosa.) Acta Horti Bergiani 7: 103-381. 1922.] Genetica 4: 544-550. 1922.

3116. BANTA, ARTHUR M., and L. A. BROWN. Some data on control of sex in Cladocera. 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 142-149. Williams and Wilkins Co.: Baltimore, 1923.—The writers found evidence that under favorable laboratory conditions parthenogenetic reproduction may continue indefinitely without resort to sexual reproduction. Thus the long-accepted internal sexual cycle seems non-existent for this material; environmental influences are held responsible for such irregular and sporadic sexual forms as occur. Indirect evidence that sexual forms,—males and sexual (ephippial) eggs,—are called forth by certain environmental factors was seen in the occurrence of sexual forms in Cladocera in an outdoor pond and simultaneously among other types of Cladocera, reared in the laboratory in culture water from the same pond. Direct evidence has been

obtained that environmental factors influence the production of males. The simple expedient of crowding the mothers causes the production of males among a population usually wholly female. In most of these experiments there are few crowded bottles in which males fail to appear and it is exceptional to find males from mothers in any of the control bottles. A satisfactory measure of sex control was obtained for every strain adequately tested. This involved 3 species of *Moina*, 3 of *Simocephalus*, and 1 of *Daphnia*.—A. M. Banta.

3117. BARKER, L. F. The relation of the endocrine glands to heredity and development. *Science* 55: 685-690. 1922.—Secretions of the endocrine or so-called ductless glands have a profound effect upon the development of the individual. Such pathological conditions as gigantism, goitre, diabetes, and others, are known to be due to abnormal functioning of these glands. Tadpole metamorphosis may be accelerated by feeding thyroid and retarded by feeding thymus. Whether these secretions may not also affect the germplasm merits investigation. On the other hand, that conditional influences may so affect the secretions of the glands that they in turn modify the germplasm in such a way that the conditional influence is inherited, appears to be merely a conjecture without supporting evidence.—P. C. Mangelsdorf.

3118. BAUR. Einige Aufgaben der Rebenzüchtung im Lichte der Vererbungswissenschaft. [Some grape-breeding problems in the light of genetic knowledge.] *Beitr. Pflanzenzucht* 5: 104-110. 1922.—The author recommends the production of wine grapes resistant to *Peronospora viticola* and *Uncinula* (*Oidium*) *Tuckeri* by crossing the better kinds of *Vitis vinifera* varieties with the disease resistant American grape species. Methods of procedure which should be followed to secure the desired results are given. The paper is followed by numerous comments [p. 110-118].—Richard Wellington.

3119. BECHER, ERICH. [German rev. of: HERTWIG, OSKAR. Zur Abwehr des ethischen, des sozialen, des politischen Darwinismus. (A defense of Darwinism, ethically, sociologically and politically.) 121 p. Gustav Fischer: Jena, 1921.] *Zeitschr. Indukt. Abstamm.- u. Vererb.* 29: 200-202. 1922.

3120. BEDWELL, C. E. A. Eugenics in international affairs. 2nd Internat. Congress Eugenics. Vol. II. Eugenics in race and state. 427-429. Williams & Wilkins Co.: Baltimore, 1923.—The author believes that the establishment of permanent national and international organizations, to carry on the work of the 1st International Eugenics Congress, London, 1912, would foster such a spirit of cooperation among the nations as would tend "to offset dangers of unrestrained ambition" and might prove to be more effective than disarmament, arbitration, and the League of Nations. As the primary object of eugenics is the improvement of race, there is a very wide field of investigation, involving problems not only of international health, but also of racial differences in connection with race migration and influence of race on human history, the possibility, by wise crossing, of perpetuating dying races and of levelling up backward races without the advanced being debased, etc.—The policy of cooperation with the League of Nations, Pan American Union, and with existant research associations is strongly advocated.—C. B. S. Hodson.

3121. BELLING, JOHN. The attraction between homologous chromosomes. 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 84-95. Williams & Wilkins Co.: Baltimore, 1923.—A brief account is given of some microscopical work with the *Daturas* bred by A. F. Blakeslee, and with *Cannas*. Homologous chromosomes in the late prophase or metaphase of the reduction division in pollen mother cells were, with rare exceptions, in connected sets of 2, 3, 4, and 5, according to the number concerned. This was found in diploids, triploids, tetraploids, diploids with 1 or 2 extra chromosomes, and tetraploids with 1 extra chromosome.—John Belling.

3122. BERNSTEIN, CHARLES. Microcephalic people sometimes called "pin head." Jour. Heredity 13: 30-39. 3 fig. 1922.—The article describes a family of 10 children, 4 boys and 1 girl being microcephalic and 5 apparently normal. The oldest girl graduated from normal school and is a successful public school teacher.—Pictures of 2 microcephalic girls not related to each other or to the Pin family are shown.—The family chart shows a history of 5 generations and the connection of these microcephalic children to the general family tree, which shows little degeneracy or dependency. The only marked causative factor of degeneracy is chronic alcoholism, which is very prevalent in a considerable number of the family fraternity.—Charles Bernstein.

3123. BLAKESLEE, A. F. Variation in the Jimson weed (*Datura Stramonium*) caused by differences in the number of chromosomes. 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics, and the family. 83-85. Williams and Wilkins Co.: Baltimore, 1923.—The author discusses the balanced and unbalanced chromosomal types in *Datura* and gives a table of those already observed.—M. E. Farnham.

3124. BLARINGHEM, LOUIS. Mosaïque héréditaire chez le pois (*Pisum sativum* L.). [Heredity mosaic in the pea.] Compt. Rend. Acad. Sci. Paris 175: 1432-1434. 1922.—Seed of intermediate color have been obtained from a green pea which originally came from the yellow Pariser Gold. These intermediate seed segregate into a majority of intermediates with graduated variations from yellowish white to dark green. The extent of segregation of the intermediate forms seems to depend upon certain conditions of growth. Mosaic heredity in the pea is influenced by the age of the plant and the climate in which it is grown.—H. C. McPhee.

3125. BLARINGHEM, L. Sur la paedogénèse du chanvre (*Cannabis sativa*). [On paedogenesis in *Cannabis sativa*.] Bull. Soc. Path. Veg. France 9: 290-294. 1922.—Flowers may occur in the axils of the 3rd or 4th leaf of juvenile plants of *Cannabis sativa* grown in the hothouse. Seed obtained from these flowers are smaller than those obtained later from the adult plants, but may contain normal embryos.—J. Dufrenoy.

3126. BLARINGHEM, L. Sur la résistance aux parasites cryptogamiques d'un hybride d'épeautre et de seigle. [Disease resistance of a hybrid *Triticum spelta* [var. T.] × *Secale cereale*.] Bull. Soc. Path. Veg. France 9: 266-276. 3 fig. 1922.—The hybrid is (1) a giant, the vegetative tissues of which retain juvenile characters and weigh 8 times more (air dry) than those formed by either parent; (2) sterile; (3) much more resistant than the parents to *Puccinia graminis*. Infestation by *Claviceps* is favored on ovaries of the hybrid, which are exposed for a very long time. However, ergots were not numerous on hybrids.—J. Dufrenoy.

3127. BLARINGHEM, LOUIS. Sur un hybride stérile d'épeautre et de seigle. [On a sterile hybrid of spelt and rye.] Compt. Rend. Acad. Sci. Paris 175: 635-637. 1922.—Five kernels were obtained from emasculated flowers of spelt (*Triticum spelta* L.) pollinated with rye (*Secale cereale* L.) pollen. The author claims that the effect of the foreign pollen, xenia, was apparent in these kernels. Five sterile F₁ plants were produced. These were taller than the parents and produced about 8 times as much dry matter per plant as the larger parent. The characters of the hybrid were in part paternal, but especially maternal,—the characters of organization being maternal, the superficial and ornamental being paternal. The flowers remain open for a considerable time, being incapable of fertilization with spelt or rye pollen, while their own stamens are empty.—C. E. Leighty.

3128. BLUHM, AGNES. [German rev. of: BILSKI, FRIEDR. Ueber Blastothorie durch Alkohol. Mit Versuchen am Frosch. (On blastothorie caused by alcohol. With experiments on frogs.) Arch. Entwicklungsmech. 47: 4. 1921.] Arch. Rass.- u. Ges.-Biol. 14: 357. 1922.

3129. BLUHM, AGNES. [German rev. of: DAVENPORT, C. B. (1) Influence of the male in the production of human twins. *Amer. Nat.* 54: 122-129. 1920 (see Bot. Absts. 5, Entry 345.) (2) Heredity of twin births. *Proc. Soc. Exp. Biol. and Med.* 17: 75-77. 1920. (3) Influence of the male in the production of twins. *Med. Rec.* 1920: 1-10. 1920 (see Bot. Absts. 8, Entry 1071).] *Arch. Rass.- u. Ges.-Biol.* 14: 197-199. 1922.

3130. BLUHM, AGNES. [German rev. of: GLANZMANN. Hereditäre hämorrhagische Thrombasthenie. Ein Beitrag zur Pathologie der Blutplättchen. (Hereditary haemorrhagic thrombasthenia. The Werlhof blood-spot disease.) *Jahrb. Kinderheilk.* 88: 1-42, 113-141. 1918.] *Arch. Rass.- u. Ges.-Biol.* 14: 201-203. 1922.

3131. BLUHM, AGNES. [German rev. of: GUYER, M. F. Immune sera and certain biological problems. *Amer. Nat.* 55: 97. 1921.] *Arch. Rass.- u. Ges.-Biol.* 14: 191-193. 1922.

3132. BLUHM, AGNES. [German rev. of: LITTLE, C. C. Note on the occurrence of a probable sex-linked lethal factor in mammals. *Amer. Nat.* 54: 457-460. 1920 (see Bot. Absts. 7, Entry 910).] *Arch. Rass.- u. Ges.-Biol.* 14: 193-194. 1922.

3133. BLUHM, AGNES. [German rev. of: PEARL, R. (1) The effect of the war on the chief factors of population change. *Science* 51: 553-556. 1920. (2) A further note on war and population. *Science* 53: 120-121. 1921 (see Bot. Absts. 10, Entry 114).] *Arch. Rass.- u. Ges.-Biol.* 14: 203-205. 1922.

3134. BLUHM, AGNES. [German rev. of: STOCKARD, C. R. Developmental rate and structural expression. An experimental study of twins, double monsters and single deformities and the interaction among embryonic organs during their origin and development. *Amer. Jour. Anat.* 28: 15. 6 pl., 32 fig. 1921.] *Arch. Rass.- u. Ges.-Biol.* 14: 188-191. 1922.

3135. BLUHM, AGNES. [German rev. of: STOCKARD, C., and C. PAPANICOLAOU. Further studies on the modification of the germ-cells in mammals. The effect of alcohol on treated guinea-pigs and their descendents. *Jour. Exp. Zool.* 26: 119-226. 1918 (see Bot. Absts. 1, Entry 501).] *Arch. Rass.- u. Ges.-Biol.* 14: 350-355. 1922.

3136. BOLLES, C. B. Creating new dahlias—a garden sport for every man. *Gard. Mag.* 36: 32. 1922.—As all new forms have been obtained from seedlings, the possibilities of obtaining new forms of merit from seedling selections seems very great. The necessity of using seed of desirable varieties and the value of controlled crosses is emphasized.—*H. K. Hayes.*

3137. BOND, C. J. Sex of Irish yew trees. *Nature* 110: 810. 1922.—All *Taxus fastigiata* trees observed are female; no male plants are known. It is believed all Irish yews are grown by cuttings from the original mutational form found a century ago in Fermanagh, Ireland. The author is interested in possible linkage of erect habit of growth with femaleness; also the effect of pollinating female Irish yew with *T. baccata* yew pollen. He has made the cross, *Taxus fastigiata* × *T. baccata*. The F₁ shows graded series from spreading (baccata) type to erect (fastigiata) type. They are too young to determine sex.—*J. Ben Hill.*

3138. BOWDITCH, HAROLD. Red-green colorblindness in three allied families. *Jour. Heredity* 13: 136-142. 1 chart. 1922.—The inheritance of the defect is traced in the families for 6 generations, and while nothing new is brought out, the truth of the accepted law of inheritance is illustrated.—*R. S. Cook.*

3139. BRAUN, K. Bemerkungen zur Verbesserung der Sisalagave durch Züchtung. [Suggestions for the improvement of the sisal agave by breeding.] *Zeitschr. Pflanzenzücht.* 8: 278-290. 1922.—The author refers to preparations made before the World War for improvement experiments with sisal agave in the former German colony in East Africa. The ideal

plant he had aimed to work for was a long-lived one (to have been selected from those that delayed blooming longest), with at least 10 leaves averaging 170 cm. or more in length. He had planned also to make use of the established fact of individual diversity in percentage of fiber. Attention was to have been paid to selection for resistance to adverse conditions.—*J. P. Kelly.*

3140. BREEZE, M. S. G. Degeneration in anthers of potato. [Abstract.] Rept. British Assoc. Adv. Sci. 1921: 462-464. 1921 [see Bot. Absts. 11, Entry 1304.]

3141. BREITENBECHER, J. K. A red-spotted sex-limited mutation in *Bruchus*. Amer. Nat. 57: 59-65. 1923.—The female of *Bruchus quadrimaculatus* has 4 black spots on the elytra; the male is not spotted. A dominant mutation alters the color of the spots in the female to red, and leaves the male unaffected. This is the 4th dominant sex-limited mutation found in the species.—*Conway Zirkle.*

3142. BREMER, G. Opmerkingen over het cytologisch onderzoek van suikerriet. [Remarks on the cytological investigation of sugar cane.] Arch. Suikerindust. Nederland.-Indië 30: 229-238. 3 fig. 1922.—A popular exposition is presented of the more important results of the research published in full elsewhere [see Bot. Absts. 12, Entry 406].—*R. D. Rands.*

3143. CÄMMERLOHER, HERMANN. Zur Frage der Heimat der Banane. [The original home of the banana.] Oesterreich. Bot. Zeitschr. 71: 262-266. 1922.—The author reviews the literature pertaining to the native habitat of the banana and points out that it has been given both an Asiatic and a South American origin. Since he found excellent relief figures of the banana, *Musa sapientum*, upon the Tempel Borobudur (Java), which is over 1100 years old, and since its name is of Sanskrit derivation, he concludes that the banana came originally from the tropics of the Old World.—*Richard Wellington.*

3144. CHAPMAN, H. H. A new hybrid pine (*Pinus palustris* x *Pinus taeda*). Jour. Forest. 20: 729-734. 1 pl. 1922.—An unusual type of pine, supposedly a hybrid, was found in 1915 by V. H. Sonderegger in Winn Parish, Louisiana, ranging southwest to Calasieu Parish. It occurred scattered at widely separated points. *P. palustris* is probably the female parent. Seed germination is in the autumn as in *P. palustris*. The juvenile foliage is similar to that of *P. palustris*, while the rapid growth and habit of the seedling resemble the *P. taeda* parent. The cones are intermediate between the parent species. Fully developed seed are formed by the hybrid but their fertility was not determined. The wood structure is like that of *P. taeda*. It yields high in naval stores. The name *Pinus Sondereggeri* is suggested for the hybrid. It has commercial possibilities in reforestation.—*J. Ben Hill.*

3145. CHRISTY, MILLER. The origin of the hybrid *Primula elatior* x *vulgaris* demonstrated in the field, with notes on other British *Primula* hybrids. New Phytol. 21: 293-300. 1922.—Intermediates were found between: (1) *P. elatior* and *P. vulgaris*, (2) *P. elatior* and *P. veris*, and (3) *P. veris* and *P. vulgaris*. The author concluded that they represented hybrids between these species. He planted *P. vulgaris* in a bed of *P. elatior*, the nearest *P. vulgaris* being 2 miles distant. Hybrids of the same type as those noted above were found in the same region 17 years later. The other hybrids were not produced in this manner. Of these the supposed hybrid between *P. elatior* and *P. veris* is rare. The range of intermediates between *P. veris* and *P. vulgaris* and the fact that they are very vigorous and semi-sterile indicate strongly that hybridization in the wild also accounts for this case.—*Margaret C. Mann.*

3146. CHRISTY, MILLER. The pollination of the British *Primulas*. Jour. Linn. Soc. Bot. 46: 105-139. 1922.—After surveying the evidence of insect visitation to 3 yellow species of *Primula* belonging to the section *Vernales*, i.e., the British primrose, oxlip, and cowslip, the author reverts to Darwin's conclusion that pollination must be due to night-flying moths. All but 5 species of Noctuidae and Geometridae known to be present when these early flowering

primroses are in bloom were eliminated because they alone had tongues long enough to reach nectar in any of the species involved. The author's conclusion is based on the following: (1) the heterostylism must be for the purpose of cross-fertilization and such insects as visit these species by day frequently enough to effect pollination would be indiscriminate in their effects; (2) one of the 5 possible species has been seen to visit a cowslip; (3) pale yellow flowers are most visible at night; (4) nectar guides of type found in flowers so pollinated are present in all 3 species; (5) scent of primroses is most noticeable at dusk. It is suggested that the question be definitely settled by experiment.—*Margaret C. Mann.*

3147. CLAUSEN, J. **Studies on the collective species *Viola tricolor* L. II.** Bot. Tidsskr. 37: 363-416. *Illus.* 1922.—Variations in the following characters in *V. tricolor* and *V. arvensis* are described, named, and illustrated: size of petals, labellum of stigma, spot on style, pollen-magazine, honey-streak, color of petals, length of spur, form of spur, form of spur-bearing petal, lateral sepals, epidermal cells of petals, pollen grains, size of leaves, form of leaves, stipules, end lobe of stipules, habit of plant, color of stem, duration of life.—That these variations are induced by genotypical differences is affirmed by observation in nature, cultivation of types under the same conditions, and by breeding experiments.—That all combinations of these variations are possible is indicated by tabulation of sets of 4, 5, or 6 characters at a time for many plants from various habitats.—That the many different isoreagents (microspecies) within the collective species *V. tricolor* L. have arisen from crosses between *V. tricolor* and *V. arvensis* and between segregants, is shown by: (1) analysis of progeny of natural populations and of segregants; (2) synthesis of mixed populations similar to wild populations by crossing *V. tricolor* and *V. arvensis*; (3) cytological evidence. All relevant and stabilized types of *V. tricolor* and *V. arvensis* have respectively 13 and 17 chromosomes (haploid). Nuclear divisions in artificial hybrids and in suspected spontaneous hybrids are very similar. When 13 *V. tricolor* chromosomes and 17 *V. arvensis* chromosomes are brought together they behave in different ways in the heterotypic metaphase. They can form either 15 bivalents, 14 bivalents and 2 univalents, or 13 bivalents and 4 univalents, the 2nd arrangement being most frequent. As no *V. tricolor* with less than 13 (haploid) are found it seems that gametes with less than that number and zygotes with less than 26 degenerate. This new type of chromosome distribution after crosses resembles that found in the F_2 of Winkler's cross *Solanum nigrum*, diploid \times tetraploid. As usually only 2 numbers, 13 and 17, occur in nature, the chromosome sets of hybrids must be unstable or plants with these combinations do not survive in nature.—That naturally occurring combinations of variations (isoreagents) should not be considered as "species" is argued from the fact that the number of these combinations is very large even when limited to homozygotic combinations. Also, some already named varieties and sub-varieties can be identified as segregants from *V. tricolor* \times *V. arvensis*. Search for expected combinations in nature was successful. All this is believed to show how little reason there is in the modern splitting up of Linnaean species, as illustrated by *Hieracium* with 1400 "species." While this course leads to chaos, the old division of species is not regarded as sufficient. Hence the following propositions are made: (1) that species be maintained in the Linnaean sense but as superior to varieties, microspecies, and isoreagents; (2) that species, so used, be critically revised with new diagnoses not including varying characters, the latter listed below with known combinations; (3) that minor units be named microspecies (Ostenfeld, 1921) and isoreagents (Raunkiaer, 1918), forma to be applied to variations caused by external conditions solely; (4) that ternar nomenclature be used for microspecies and isoreagents.—*V. tricolor* and *V. arvensis* must be regarded as distinct species, although they intercross, because: (a) chromosome numbers are distinct; (b) 2 well defined types are far more frequent than transition types; (c) hybridization does not result in simple Mendelian segregation because of the chromosome situation.—The only guide as to original *V. tricolor* and *V. arvensis* types is the frequency of character combinations in nature; Geographically they are co-extensive.—Distribution of isoreagents follow definite limitations of environment, e.g., degree of soil acidity.—Adaptation of certain microspecies to peculiar environmental complexes is explained not as a direct effect of the conditions but as the result of mutations, crosses, and subsequent selection.—*E. B. Babcock.*

3148. COCKERELL, T. D. A., and DOROTHY YOUNG. A mutation of the columbine. *Nature* 110: 701. 1 fig. 1922.—A single plant of *Aquilegia coerulea* James was found near Ward, Colorado, which had the sepals deeply trifold.—O. A. Stevens.

3149. COOK, O. F. Are any species uniform? Or should the assumption of "pure" species be discarded and diversity recognized as the normal evolutionary condition? *Jour. Heredity* 13: 285-287. 1922.—There appears to be no doubt as to the existence of "impure" or heterozygous species. There is considerable doubt however regarding the existence of species that may accurately be called "pure" or uniform. Taxonomists' ideals of uniformity differ from those of geneticists and evolutionists. Species which the taxonomists consider pure are often very heterozygous. The author believes that species cannot originate by sudden mutations but only by gradual modifications in the network of descent.—P. C. Mangelsdorf.

3150. COOPER, H. P. The inheritance of the spring and winter growing habit in crosses between typical spring and typical winter wheats, and the response of wheat plants to artificial light. *Jour. Amer. Soc. Agron.* 15: 15-25. 1923.—In both direct and reciprocal crosses between true spring and true winter wheats, the short vegetative period is dominant. Crossing of a spring type (Marquis) and 3 winter types shows that there is a dominant factor for winter and an inhibitor against winter involved, for there resulted a ratio of approximately 13 spring to 3 winter forms. By artificially lengthening the daily duration of light, it is possible to grow 2 generations of spring grains in 1 year.—F. M. Schertz.

3151. CROWTHER, C. R. Evolutionary faith and modern doubts. *Nature* 109: 777. 1922.—The author criticises Bateson's statement [see *Bot. Absts.* 12, Entry 1767] that "The conclusion in which we were brought up, that species are a product of a summation of variations, ignored the chief attribute of species, that the product of their crosses is frequently sterile in greater or less degree." The author thinks it easier to imagine sterility arising from a gradual modification spread over a length of time, and involving many chromosomes, than from the half monstrous variations chiefly studied by Bateson, variations which appear to affect only a few chromomeres, and those by loss alone.—Walter Scott Malloch.

3152. DANFORTH, C. H. The frequency of mutation and the incidence of hereditary traits in man. 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 120-128. Williams & Wilkins Co.: Baltimore, 1923.—Several well-known hereditary traits are clearly detrimental to their possessors. Others, while not obviously detrimental, are almost certainly not beneficial. The incidence of these traits must depend on the frequency of their determining genes in the racial germ-plasm, and since there is good evidence that some of them have appeared from earliest times, the incidence, at least of the adverse traits, must be maintained by occasional mutations. Among hereditary traits that are presumably indifferent the incidence varies in different racial groups. This racial difference implies a different rate of mutation in different human strains, and this rate can be estimated roughly by taking into account the length of time since 2 or more racial stocks diverged from a common source. Estimated in this way it seems probable that in some directions mutations have occurred in not more than 1 gene in 30,000 while in other directions the mutations have apparently been more frequently. The indications are that parallel mutations appear in different races, but that a more or less pronounced tendency toward a certain type of mutation may itself be a racial characteristic.—C. H. Danforth.

3153. DARWIN, LEONARD. Aims and methods of eugenical societies. 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 5-19. Williams & Wilkins Co.: Baltimore, 1923.—The aims of eugenical societies are discussed in general terms. All proposals made should be based on heredity. Rules of conduct in regard to parenthood, and methods of stimulating conduct productive of racial progress are to be considered. Eugenics is the advocacy of social reforms based on genetics. Only general principles can now be laid

down in regard to many problems. Moral principles are to be kept in the foreground. Eugenic reform is unlikely to be rapid. Ways in which the aims can be promoted are cited.—*Leonard Darwin*.

3154. DARWIN, LEONARD. **The field of eugenic reform.** 2nd Internat. Congress Eugenics. Vol. II. Eugenics in race and state. 189–202. Williams & Wilkins Co.: Baltimore, 1923.—Some eugenists would cover a wider field than others. When dealing with single factor qualities, to prevent parenthood might eliminate the evil but could not raise the general standards. In such cases individuals must be selected; as also with criminals, wastrels, etc. Segregation and sterilization are discussed. With multiple factor qualities, individual selection is less effective. Reforms should deal with large numbers. Correlation between infertility and superiority leads to deterioration. The questions of a moral campaign in favor of fertility, financial burdens, motherhood endowment, and state aid to the inefficient are considered.—*Leonard Darwin*.

3155. DAVENPORT, CHARLES B. **Research in eugenics.** 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics, and the family. 20–28. Williams & Wilkins Co.: Baltimore, 1923.—This gives the history and the needs of, and some of the results already obtained, in research on human heredity. In addition are discussed (with some practical application) mate selection, fecundity, and influence of immigration on national traits.—*C. B. Davenport*.

3156. DAVIDSON, DORIS. **The inheritance of ability.** [Rev. of: TERMAN, L. **The intelligence of school children.** 317 p. Houghton Mifflin: Cambridge, Massachusetts, 1919.] Jour. Heredity 13: 124–126. 1922.—Terman's book is a study of 41 children rating exceptionally high in intelligence tests. Family histories were given in all instances. In 72 cases the occupation of the father is given, who in 18 is a professional man and in 17 a college graduate. In only 2 cases is it stated that there were no relatives of superior intelligence on either side of the family.—*R. C. Cook*.

3157. DONCASTER, L. **Further observations on chromosomes and sex-determination in *Abraxas grossulariata*.** Quart. Jour. Microsc. Sci. 66: 397–408. 1922.—This paper was completed after Doncaster's death by his assistant, RUTH C. BAMBER (MRS. BISBEE). In a previous paper (Jour. Genetics 4: 1. 1914) the inheritance of a tendency to produce families consisting chiefly or entirely of females was described. Females of the strain had 55 chromosomes as the somatic number; all males and most other females had 56. In maturation of the 55-chromosome strain, 28 pass to one pole and 27 to the other. Since all spermatozoa had 28 it seemed evident that the egg with 27 must be female-determining. The above observations were supported by Morgan on *Phylloxera*. The extra chromosome seemed to go into the polar body—though in *Phylloxera* these eggs always became males. In later work published in a letter to Nature (June 10, 1915) Doncaster did not seem to bear this out. Two questions are at issue: (1) whether the all-female families are so because all the fertilized eggs are truly female, or whether they arise through non-viability of male zygotes; (2) if all zygotes in such families are female, whether egg-nuclei before fertilization contain always 27 chromosomes, sometimes 28. There is no evidence regarding the first. Evidence from the use of various stains indicates that a certain amount of chromatin is left behind on the equator of the spindle in anaphase. If so, perhaps the sex-chromosome loses so much chromatin that it becomes useless; hence the all-female families from eggs, some of which contain 27 and others 28 chromosomes.—*C. S. Hoar*.

3158. DOWN, E. E., and O. B. WINTER. **Selecting mother sugar beets.** Quart. Bull. Michigan Agric. Exp. Sta. 5: 36–38. 1 pl. 1922.—The mother sugar beets with higher sugar content may be recognized by the specific gravity method, as there is a fairly close correlation between high specific gravity and high sugar content. The method outlined is one that has long been known in Germany. The writers point out the necessity of storing and handling the mother beets in a uniform, careful manner if the method outlined is to be of much value.—*H. K. Hayes*.

3159. DUBLIN, LOUIS I. **Mortality of foreign race stocks.** 2nd Internat. Congress Eugenics. Vol. II. Eugenics in race and state. 78-89. Williams & Wilkins Co.: Baltimore, 1923.—Studies made of the mortality rates in the various race stocks in Pennsylvania and New York show important differences in the several groups. The native born of native parentage have the lowest mortality rate and the foreign born, the highest. The foreign born and the native born of foreign or mixed parentage agree much more closely with each other than with native stock.—Of the foreign born groups, the Russians, who are mostly Jews, the Italian, and the Austro-Hungarians present the most favorable conditions. The British, the Germans, and the Irish have death rates very much in excess. Pulmonary tuberculosis, pneumonia, and the degenerative diseases are largely responsible for this unfavorable mortality of the 3 stocks last named.—The figures appear to indicate that the immigrants of New York State and Pennsylvania are not representative of the most vigorous in their own races, the death rates being often higher here than in their own countries.—*Louis I. Dublin.*

3160. DUCK, R. W. **Mendelism in fur sheep crosses—II.** Jour. Heredity 13: 63-68. 4 fig. 1922.—In a previous paper [see Bot. Absts. 11, Entry 3830] it appeared that the black fur of homozygous Karakul sheep was dominant to the white of the Longwool. A discussion of the appearance of occasional red lambs in Karakul \times Longwool crosses was reserved for a later paper. It appears that the natives of Transcaspia, the home of the Karakul, conduct their sheep breeding operations carelessly and that mixing with the red-wooled breeds, also found in that region, is almost certain to occur. Data from breeding experiments at the Dawley Farm, Fayetteville, New York, are presented to substantiate the theory that the supposed homozygous Karakul rams are really heterozygous for red. An account is also given of a peculiar 6-horned Karakiev ram. Breeding experiments indicated that the character was entirely lacking in dominance,—not appearing in the F_1 progeny.—*R. C. Cook.*

3161. DUNN, L. C. **Some results of race mixture in Hawaii.** 2nd Internat. Congress Eugenics. Vol. II. Eugenics in race and state. 109-124. Williams & Wilkins Co.: Baltimore, 1923.—This paper presents the preliminary results of a study of the physical anthropometry of Hawaiians of pure and mixed bloods. Hybridization between native Hawaiians and other races exists in incipient stages, most of the hybrids observed being of the 1st generation and very few further removed than 2 generations from the original cross (F_2 or backcross). Of the race mixture involving Hawaiians as 1 element, about 57 per cent in the sample of 344 cases was attributable to crosses with 1 of the white races, chiefly North European and Portuguese; about 31 per cent involved crosses of Hawaiian and Chinese; only 2 per cent involved Hawaiian and Japanese; and the remaining 10 per cent consist of crosses with other stocks: Negro, American Indian, Philipino, Malay, Hindoo, etc. The commonest triracial mixture was Hawaiian-Chinese—"White."—The south Chinese (coolies from Quantung) proved the purest of any of the racial groups involved in the crosses and the most conservative in all characters; they differ from the native Hawaiians in head form, stature and its segments, nose shape, hair form, and other characteristics. In a small number of hybrids most of these characteristics were intermediate between the parent types (e.g., stature); in some they resembled the Chinese (e.g., hair form), and in others presented an appearance different from either parent race (e.g., head form). The production of new types from this and similar racial crosses by recombination and segregation of heritable factors is briefly discussed.—*L. C. Dunn.*

3162. DUNN, L. C. **The relationship between the weight and the hatching quality of eggs.** Connecticut [Storrs] Agric. Exp. Sta. Bull. 109. 89-114. 1922.—A total of 545 eggs laid by 47 White Leghorn pullets and 170 eggs laid by 18 White Leghorn hens were weighed and incubated. Average-weight eggs hatched better than either large or small eggs. No correlation was found between the weight of an individual bird's eggs and the percentage of fertile eggs that hatched. A slightly greater hatchability was found in the eggs weighing less than the mean than in those weighing more than the mean.—*F. A. Hays.*

3163. EHRENBERG, PAUL. **Die Wirkung der Ernährung auf die Entstehung von bleibenden Veränderungen der Pflanzen.** [The effect of nourishment on the origin of permanent changes

in plants.] Beitr. Pflanzenzücht. 5: 45-67. 1922.—The author cites the influence of environmental factors, acting through the nutrition, upon the morphology and physiology of plants and offers evidence which he believes indicates that the induced changes are inherited. Thus, by appropriate external stimuli, the normal biennial habit in beets may be changed to the annual habit, and *vice versa*. Since both annual and biennial races of beets are known, the 2 methods of flowering must be inherited. Hence, the author believes, it is reasonable to suppose that when a change in the time of flowering is brought about by artificial stimuli, hereditary changes at the same time have been induced through alterations in the nutrition. From similar lines of argument, but without detailed evidence from pedigreed cultures, it is believed that increased relative weight of straw to grain in wheat under irrigation, and increased number of ears in maize under favorable weather conditions, as well as certain other modifications brought about by the environment, are to be classed as induced changes which are hereditary. In the discussion following the address [p. 67-71] W. OETKEN, Ph. STOLL, and SPERLING speak of the effect of cold upon time of flowering, and KOSTLAN, ROEMER, and SEELHORST of the length of time necessary to induce hereditary changes.—A. F. Blakeslee.

3164. EMOTO, YOSHIKADZU. Über die relative Wirksamkeit von Kreuz- und Selbstbefruchtung bei einigen Pflanzen. [The relative effectiveness of cross- and self-fertilization on several plants.] Jour. Coll. Sci. Tokyo Imp. Univ. 43: 1-31. 2 pl., 6 fig. 1920.—This paper discusses the relative effectiveness of cross pollination as compared with selfing by pollen from the same flower or other flowers on same plant. The plants studied were *Primula sinensis*, *P. obconica*, *Brassica campestris*, *Tricyrtis hirta*, *Hyacinthus orientalis*, *Freesia leichtlini*, and *Tritonia aurea*. Cross pollination yielded most seeds in all species. It was also most effective in a majority of species in respect to number of capsules set, size of capsule, weight of seeds, and percentage of germination.—L. L. Burlingame.

3165. ESTABROOK, ARTHUR H. The tribe of Ishmael. 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 398-404. Williams & Wilkins Co.: Baltimore, 1923.—The Tribe of Ishmael is a large group of degenerates descended from several hundred family heads, with the Ishmael family itself the central and most degenerate. These people have lived mostly in Indiana and the neighboring states. The different families of the Tribe came to Indiana, separately in most cases, on the general tide of immigration west from the original colonies. There is reason to assume that some of these families came from the convicts deported by England to America in early times. The pauper and criminal families which comprise the Tribe number about 10,000 people. Many have been inmates of institutions, receive poor relief, and live by begging. Many are feeble-minded. There are 3 outstanding characteristics of the Tribe: pauperism, licentiousness, and gypsying. Some families or individuals in new communities have mated into new stocks and some improvement is found where the mating has been into a stock carrying better traits and abilities. The matings in general however have been like to like with a resulting poor offspring which in turn has shown a low social reaction. The story is much like that of the Jukes and other defective families.—A. H. Estabrook.

3166. EWART, J. COSSAR. Sheep breeding experiments in Scotland. British Res. Assoc. Woolen and Worsted Indust. Publ. 14. March, 1922.—The author summarizes briefly the probable origin of the European breeds of sheep. He holds that the short-tailed primitive breeds, such as the Soay and Shetland, were derived from crosses between the Mouflon and Urial and that the long-tailed breeds are derived largely from varieties of the Ammon and the fat-tailed and fat-rumped sheep of central Asia. He describes the results of first crosses between the Highland Blackface and Southdown sheep, between Blackface and Soay, Blackface and Siberian-Shetland.—Sewall Wright.

3167. EYSTER, WILLIAM H. Inheritance of zigzag culms in maize. Genetics 7: 559-567. 1922.—Zigzag culms is an abnormality of maize in which some of the internodes are shortened, thickened, and twisted. This abnormal condition is recessive to the normal form and results

from the interaction of 2 factors designated $Zg\ zg$ and Zz . One of these factor pairs $Zg\ zg$, is very closely linked with a chlorophyll disorder known as green-striped leaves and designated $Gr\ gr$.—*J. H. Kempton.*

3168. EYSTER, W. H. The intensity of linkage between the factors for sugary endosperm and for tunicate ears and the relative frequency of their crossing over in microspore and megaspore development. *Genetics* 7: 597-601. 1922.—The average per cent of crossing over between the 2 linked characters of maize, Tunicate, $Tu\ tu$, and sugary endosperm, $Su\ su$, has been determined to be 28.63 ± 0.45 . While the degree of linkage between these characters is variable, there is no appreciable difference between the rate of crossing over in microsporangogenesis and megasporogenesis, a condition found with other linked characters in maize.—*J. H. Kempton.*

3169. FELDMAN, H. W. A fourth allelomorph in the albino series in mice. *Amer. Nat.* 56: 573-574. 1922.—A new mouse mutant has been obtained from a fancier who had been breeding it for some time. It resembles the ruby-eyed guinea pig, ruby-eyed rat, and ruby-eyed or chinchilla rabbit in the degree of pigment reduction in the hair; but the eyes are apparently darker than those of the rat and guinea pig. This mutation forms one of a series of quadruple color allelomorphs in the mouse, and the author designates it as c . In a scale of dominance, the 4 forms probably fall in the following order: intense or wild color C , dilute c^r (herein described), extreme dilute c^d , and complete albinism c . Wild color, C , is completely dominant to other allelomorphs, but c^r and c^d are incompletely dominant to albinism. The cross between c^r and c^d has not yet been made, but the heterozygote ($c^r\ c^d$) will probably be intermediate in color.—*B. W. Johnson.*

3170. FERGUS, E. N. Self-fertility in red clover. *Kentucky Agric. Exp. Sta. Circ.* 29. 17-36. 1922.—A review of literature on self-sterility of red clover is given which indicates that red clover is generally considered self-sterile although occasional seed may set under bags. Preliminary tests of a method of artificial self-pollination, which consists in rolling the heads between thumb and fingers, indicated that this method was efficient in causing self-pollination. Approximately 650 heads, each representing a separate plant, were artificially self-pollinated by this method. From 32 of these plants 153 seed were secured, several producing many seed. All of the seed were sown and the following year 79 normal plants were obtained. Artificial self-pollination was performed on 463 heads, of which 115 set seed yielded an average of 9.0 seed per head. A single plant produced 134 seed in 5 self-pollinated heads. The self-pollinated seed obtained were from the progeny of 13 of the original 32 plants which set seed. Strains which produced many seed in the 1st self-pollination tests were generally highly self-fertile in the next generation. Four strains produced some chlorophyll-deficient seedlings, which is considered evidence of self-fertilization. Greater uniformity was noted between the selfed progeny of individual plants than between the progeny of individual open pollinated plants. The 5 progeny obtained by self-pollination from 1 parent plant were all highly resistant to mildew.—*W. D. Valleau.*

3171. FETSCHER. [German rev. of: BAUER, J. *Vorlesungen über allgemeine Konstitution- und Vererbungslehre.* (Lectures on the "human constitution" and heredity.) iv + 186 p., 47 fig. Julius Springer: Berlin, 1921.] *Arch. Rass.- u. Ges.- Biol.* 14: 195. 1922.

3172. FISCHER, G. Originalsaatgut und Vermehrungsanbau. [Original seed stock and culture for increase of the stock.] *Zeitschr. Pflanzenzücht.* 8: 295-308. 1922.—Marked differences in powers of increase of various plants prevent an arbitrary designation of some particular generation from the originally selected parent as the original seed stock ("Originalsaatgut"). Inquiry revealed that in 21 cases out of 37, the 5th generation of seed from the initial selection was sold as original seed stock. The author also discusses selling diverse generations from the originally selected parents as original seed stock, restoring original seed stock in increase establishments, and the advisability of inserting "élite increase plots" between the breeding farms and the increase establishments.—*J. P. Kelly.*

3173. FISHER, R. A. **Darwinian evolution by mutations.** 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 115-119. Williams & Wilkins Co.: Baltimore, 1923.—Many misapprehensions have arisen as to the bearing of modern research on the Darwinian theory of natural selection. It is here contended that, apart from changes in the use of words, the only serious point in which Darwin's views require modification is that Darwin appears to have considered that the ordinary differences between parent and child are due to new mutations occurring afresh in each generation, whereas modern work shows that mutations are of infrequent occurrence, and that the differences commonly observed are due for the most part to the rearrangement, on the Mendelian scheme, of old heritable differences long incorporated in the species. It is shown that this fact does not at all diminish the efficacy of natural selection. The conditions under which new genes become incorporated in the genetic stock of the species are discussed; and the conclusion is drawn that the utility of sexual reproduction with Mendelian inheritance lies in the fact that it allows a wide genetic variation with a minimum of mutation.—*R. A. Fisher.*

3174. FISHER, R. A. **New data on the genesis of twins.** 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 195-197. Williams & Wilkins Co.: Baltimore, 1923.—Attention is called to (1) the importance of the evidence supplied by twins of inheritance of human traits, (2) inconsistency of current biological theories of the genesis of twins with twin measurements published by Thorndike, which constitutes the only available numerical data. Thorndike's measurements suggest a uniform type of origin for the majority of twins, intermediate between the supposed "fraternal" and "identical" types. The supposition that twins are alike in maternal inheritance but not necessarily in paternal inheritance has definite Mendelian consequences by which it may be tested. Such cases as are available in albinism, eye color, and other, probably Mendelian, traits appear to support this supposition. The number of cases at present available are admittedly inconclusive but afford grounds for further inquiry.—*R. A. Fisher.*

3175. FISHER, R. A. **The evolution of the conscience in civilized communities (in special relation to sexual vices).** 2nd. Internat. Congress Eugenics. Vol. II. Eugenics in race and state. 313-317. Williams & Wilkins Co.: Baltimore, 1923.—The evidence for the inheritance of mental and moral qualities which has been adduced by modern work in psychology, statistics, and genetics is confirmed by the historical facts of the evolution of moral opinion in civilized communities. In the case of the mental attitude towards practices limiting population, the selective agency may be indicated, and the change of moral opinion traced in successive ages. As examples, are taken female infanticide of the pre-Moslem Arabs, and the abortion in the Greek and Roman civilization. Effects of these selective agencies are still apparent in modern vital statistics, and they should be borne in mind in discussing modern contraceptive practices.—*R. A. Fisher.*

3176. FISHER, R. A. **The systematic location of genes by means of crossover observations.** Amer. Nat. 56: 406-411. 1922.—The author develops a method of calculating the most probable values for linkages ("distances") of any set of closely adjacent genes (genes between which double crossing-over is negligible) from results of any series of experiments involving various combinations of these genes. The chance of getting the entire result actually obtained (1) is the product of the chances for each individual in the counts having been what it was, the chance of an individual being a cross-over in the first distance being represented as p_1 , the chance for a cross-over in second distance as p_2 , etc. The problem then is to find values of p_1 , p_2 , etc., at which the chance of getting the entire result obtained is a maximum. The latter is maximum when its derivatives with respect to p_1 , p_2 , etc., are 0; also when these derivatives of its $\log = 0$, which is a more practicable expression. Logarithmic derivatives of (1), equated to 0, are therefore to be solved for p_1 , p_2 , etc. This gives nonlinear equations (equations involving powers higher than the first of the variables p_1 , p_2 , etc.) but linear approximations may be obtained from these by expanding them according to Taylor's theorem, and using only those terms in the expansion which involve first or zero powers of p_1 , p_2 , etc; (higher powers become

negligible here on the assumption that real values of p are not very different from the experimental). The simultaneous linear equations thus obtained are:

$$\begin{aligned} a_{11} p_1 + a_{12} p_2 + a_{13} p_3 & \dots\dots\dots = b_1 \\ a_{21} p_1 + a_{22} p_2 + a_{23} p_3 & \dots\dots\dots = b_2 \\ a_{31} p_1 + a_{32} p_2 + a_{33} p_3 & \dots\dots\dots = b_3 \end{aligned}$$

where a_{11} is the sum of the values $\frac{(\text{total individuals})^2}{\text{crossovers} \times \text{non-crossovers}}$ to be obtained from all experi-

ments in which the first distance, p_1 , or any distance that includes p_1 is studied, a_{12} (or a_{21}) is the sum of such values from those experiments in which the distance $p_1 + p_2$ or any distance

including both p_1 and p_2 is studied, etc.; and b_1 is the sum of the values $\frac{(\text{total individuals})^2}{\text{non-crossovers}}$

from all experiments dealing with p_1 , or a distance that includes it, etc. The author applies this method to obtain the most probable chromosome map from certain results of Lancefield and Metz, and then calculates the accuracy of fit of the observed series of results to this map. The fit is fair, though not close,—doubtless owing to genetic or environic influences causing slight variations in frequency of crossing over.—*H. J. Muller.*

3177. FRECKMANN, W. *Pflanzenzüchtung und Moorkultur*. [Plant breeding and moor-culture.] Jour. Landw. 70: 109-116. 1922.—Cultivation of moors is regarded as necessary for German agricultural self-sufficiency. Several satisfactory varieties of potatoes and beets are cultivated on moors, but their development has not been due to plant breeders. Breeders should look to their further development and find suitable strains of rye, barley, legumes, and hemp.—*Helen D. Hill.*

3178. FRIMMEL, FRANZ. Über die Vererbung der Fruchtgrösse der Tomaten. [Inheritance of fruit size in tomatoes.] Zeitschr. Pflanzenzücht. 8: 457-462. 1922.—Size of fruit in tomatoes is a complex character depending upon number of carpels per fruit and size of individual carpels. Varieties (29) of tomatoes having an average fruit weight of 5-200 gm. were crossed with Burbank's Preserving, a small non-fasciated variety with an average fruit weight of less than 5 gm. Average weight of the hybrids varied from 16 to 25 gm. Fasciation, which is necessary for large fruits, appears to be recessive in these crosses. Heterosis in the hybrids was marked. Average yield per acre of the hybrids was greater than for standard varieties by more than 3000 pounds per acre. The author believes that this increase justifies crossing as a commercial practice.—*P. C. Mangelsdorf.*

3179. FRUWIRTH, C. *Handbuch der landwirtschaftlichen Pflanzenzüchtung*. Bd. I. Allgemeine Züchtungslehre der landwirtschaftlichen Kulturpflanzen. [Handbook of agricultural plant breeding. Vol. I. General principles for the breeding of agricultural plants.] 6th rev. ed., xviii + 443 p., 8 pl., 91 fig. Paul Parey: Berlin, 1922.—A comprehensive, general treatment of the theoretical principles of genetics and their application to plant breeding is given. The edition differs from the 5th only in scattered changes throughout the book.—*R. E. Clausen.*

3180. GAINES, E. F., and F. J. STEVENSON. Rye-wheat and wheat-rye hybrids. Jour. Heredity 13: 81-90. 4 fig. 1922.—This is the 1st record of a cross between *Secale* and *Triticum* in which rye was used as the female. Rosen rye was used as the female parent in crosses with Hybrid 128, Winter Fife, and Jenkin wheats; and as the pollen parent in a cross with Turkey wheat. In all crosses the hybrid offspring resembled the species of the female parent. The F_1 plants showed a high degree of sterility but some of the F_2 plants were fully fertile. *Tilletia Tritici* was found in the F_2 of both Hybrid 128 \times Rosen and Rosen \times Turkey. The results indicate an unusual recombination of chromatin as rye has 7 chromosomes while the wheats have 21.—*E. F. Gaines.*

3181. GARMAN, H., and H. H. JEWETT. The white flies of hot houses. *Asterochiton abutilonea* by H. Garman and *Asterochiton vaporariorum* by H. H. Jewett. Kentucky Agric. Exp.

Sta. Res. Bull. 241. 75-111. 10 fig. 1922.—A few observations are recorded on the life history and physical characters of *A. abutilonea* followed by a comprehensive life history study of *A. vaporariorum*. Tests of various insecticides for control are recorded. Fertilized and unfertilized females of *A. vaporariorum* show no appreciable difference in the number of eggs laid. Unfertilized eggs produce all males. Fertilized eggs do not produce all females, the proportions being nearly 40 per cent males and 60 per cent females. In one case of 818 adults collected in the greenhouse in May, 549 were females and 270 males. In March of the same year, of 362 adults collected 212 were males and 150 were females.—W. D. Valleau.

3182. GATENBY, J. BRONTÉ. Sex change in Mollusca. Nature 110: 544. 1922.—The author objects to Spärck's conclusion [see Bot. Absts. 12, Entry 3267] that the male stage in the oyster is due to low temperature. He cites observations on certain hermaphrodite Mollusca which seem to show that nutriment is a determining factor, and other observations which point to factors other than temperature and nutriment.—R. E. Clausen.

3183. GATES, R. RUGGLES. A new type of variability in plants. 2nd. Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 100-101. Williams & Wilkins Co.: Baltimore, 1923.—The current interpretation of size inheritance depends upon the assumption of several cumulative Mendelian factors for size, without dominance and with free distribution of the factors in the germ cells of hybrid generations. This conception has been applied to many cases of quantitative inheritance. It is at least possible, however, that the inheritance of repeated parts such as flowers and leaves may follow a different law from that of the inheritance of size or weight of the organism as a whole. In crosses between *Oenothera* species (*O. rubricalyx* and *O. biennis*) with large and small flowers the F_1 is intermediate in petal-length, while in later generations a wider range of variation occurs than in both parent species together, different lengths of petal occurring on the same plant and even sometimes in the same flower. Curves of variability show that these differences are partly inherited but without fixed units being involved. In later inbred generations the range of variation is progressively less, until the curve of variation resembles an ordinary fluctuation curve. This type of behavior is then intermediate between (1) fluctuation and (2) Mendelian inheritance. It may depend in part on mass segregations occurring in the cytoplasm, as contrasted with the segregation of chromosomes in the germ cells.—R. Ruggles Gates.

3184. GATES, R. R. Mutations and evolution. New Phytol. 19: 26-34, 64-88, 132-151, 172-188, 213-253. 1920.—The subject is discussed mainly from the point of view of *Oenothera* mutations.—I. Introduction. The modern Mendelian-mutationist's view of evolution is at best only a slight refinement of Darwinism. "When Darwin refers to individual differences it is usually clear that he is citing what we should now call small or parvigrade (Poulton) mutations. * * * It appears probable that the era of the vain search for a single evolutionary principle is now at an end. * * * Future advance in the understanding of evolution must then consist in the determination of the limitations of each factor."—II. Foundations of the mutation concept. Most conspicuous and most clearly understood types of *Oenothera* mutants are forms having 1 extra chromosome (e.g., *O. lata*). These, as well as certain triploid mutants (e.g., *O. semi-gigas*), never breed true and can only occupy a somewhat temporary and aberrant place in evolutionary descent. Tetraploid forms, however (e.g., *O. gigas*), breed true and evidently represent a condition of considerable evolutionary significance. The author recognizes that the most frequent type of mutation in most organisms is locus change. He discusses general characteristics of locus change; nature of "mass mutations;" origin of duplicate genes. Seeming infrequency of these simple Mendelian factor mutations in *Oenothera* is probably due to masking by lethal factors.—III. Forms having an extra chromosome. As regards 15-chromosome forms of *Oenothera*, several of the types have probably arisen from *O. Lamarckiana* as the result of different chromosomes becoming the extra one. Others, closely related to *O. lata*, probably have same extra chromosome. Differences between forms of the latter group are accounted for partly by presence of other mutational characters in addition to the extra chromosome, "and partly by fresh rearrangements of the 15 chromosomes."—IV. Non-

disjunction in *Drosophila*. Bridges' work on primary and secondary non-disjunction of X-chromosomes is considered in detail and attention called to the fact that in *Drosophila* and other animals individuals containing an extra chromosome show no external peculiarity, whereas in the 15-chromosome forms of *Oenothera* external characters are always directly affected.—V. Parallel mutations. Cases are discussed in *Oenothera* and in *Drosophila* (work of Metz) in which the same or similar mutations have originated independently in different species. "The evidence from these parallel mutations with similar linkage relationships shows that even the finer elements of the germplasm have maintained their relative positions and potentialities from species to species."—VI. Presumptive mutations in wild and cultivated plants. Mutation "is so common in flowering plants that it may be considered exceptional to find a species without any mutational varieties." Many examples are briefly described.—VII. Mutations in animals. Well known mutations in wild and domesticated forms are briefly described and discussed.—VIII. Limitations of the cell theory. Modern experimentalists tend to refute or ignore views of many paleontologists, anatomists, and others who deal with non-experimental data of evolution involving orthogenesis and inheritance of acquired characters. The author maintains both factors are necessary to account for evolution, and attempts to clarify the situation by distinguishing 2 general types of characters in higher organisms: (1) cell characters, or karyogenetic characters, which arise through mutation, are represented in every cell and are usually inherited as distinct units; (2) organism-as-a-whole characters, or organismal characters, which arise through impact of the environment or through orthogenesis, may apply only to localized portions in the life-cycle of the organism (show recapitulation), and "at first are not incorporated in the germplasm."—IX. The recapitulation theory. This principle, which is universally recognized, implies that at some stage in phylogeny an increase in the life-cycle took place by the addition of certain stages. This contrasts sharply with germinal (mutational) change, "which necessarily modifies every stage, at least internally as regards nuclear structure, but can hardly be held to * * * increase the number of stages in the life-cycle." Recapitulation implies inheritance of acquired characters. Applications of the principle in plant and animal kingdoms are discussed.—X. Inheritance of acquired characters. Recent experimental evidence is discussed and the point stressed that Neo-Lamarckian and mutation factors in evolution are not incompatible.—XI. General comparison of recapitulatory and karyogenetic characters. Cases in which mutational (karyogenetic) characters are superimposed on recapitulatory (organismal) characters are discussed. The latter always involve gradual adaptation to a new habitat, while the former do not. Mutational characters are stable from the outset, but fixation of organismal characters requires a number of generations; * * * in the process, altered metabolic products in the cytoplasm ultimately produce a modification of a chromatin element which is permanent in character."—XII. Orthogenetic characters. These stand midway between karyogenetic and organismal characters. Like the former, they are germinal in origin; and like the latter, they show recapitulation; but recapitulation is not adaptational. A bibliography of 187 titles is given.—Merle C. Coulter.

3185. GATES, R. R. Some points on the relation of cytology and genetics. Jour. Heredity 13: 75-76. 1922.—The author refers to certain points raised by E. Eleanor Carothers in a review of Sharp's Cytology, and points out that in many plants the search for chromosome tetrads is futile since they do not regularly occur. In *Oenothera* and *Lactuca* the heterotype division separates whole chromosomes. The only exception to this is that in *Lactuca* twisting of the chromosomes round each other occurs and apparently leads later to crossing over. There is definite evidence for this in *Lactuca*, but in *Oenothera* such twisting has never been seen and must be very rare if it occurs at all. Hence there is no known basis for genetical crossing over in *Oenothera* although there is clearly such a basis in *Lactuca*.—R. R. Gates.

3186. GHIGI, ALEXANDRE M. L'hybridisme dans la genèse des races domestiques d'oiseaux. [Hybridism in the origin of domestic races of birds.] Genetica 4: 364-374. 1922.—Crosses were made between different species of guinea-fowl, domestic poultry, pigeons, and geese. In most cases considerable difficulty was experienced in securing an F₂ generation as most of the hybrids appeared sterile. Both physiological and morphological causes are

thought to be responsible for the sterility. The races of domestic fowl are divided into 3 general types: (1) races somewhat similar in body type and producing white eggs; (2) races of variable body type and shape and producing brown eggs; (3) races developed from crosses of the first 2 types. Many characters were studied and cited to show the composite origin of modern races of fowls.—*F. A. Hays.*

3187. GOLDSMITH, WM. M. "The Catlin mark." *Jour. Heredity* 13: 67-71. 4 fig. 1922.—An account is given of the inheritance for 5 generations of a curious defect in the parietal bones of the skull. The defect varies in size from a hole 1 inch in diameter to a mere depression in the bone without a hole. The holes are larger during childhood than in later life. The defect causes only slight inconvenience and has no apparent effect on mentality.—*R. C. Cook.*

3188. GOUGH, G. C. Bud variation in potatoes. *Gard. Chron.* 71: 334. 1922.—Cases of a white variety throwing a colored tuber and *vice versa* are discussed and references and data on the subject from German literature are given.—*P. L. Ricker.*

3189. GOWEN, JOHN W. Report of progress on animal husbandry investigations in 1920. *Maine Agric. Exp. Sta. Bull.* 299. 85-120. Fig. 37-43. 1921.—The following subjects studied at the Maine Agricultural Experiment Station in 1920 are discussed: ability of different men to judge the dairy cow for milk yield; relative value of the 7-day and 365-day milk yield as a measure of the milking capacities of the cow; mean butter-fat yield of the different breeds and their advanced registry requirements; relation of twinning to age in dairy and beef cattle; progeny performances of Holstein-Friesian sires; inheritance of milk yield and butter-fat percentage as indicated by 1st-generation crosses; Mendelian experiment on the inheritance of milk yield and butter-fat percentage; the effect of modifying milk for butter-fat content on the content of the other solids.—*Sewall Wright.*

3190. GOWEN, JOHN W., and MILDRED R. COVELL. Studies in milk secretion. IX. On the performance of the progeny of Holstein-Friesian sires. *Maine Agric. Exp. Sta. Bull.* 300. 121-252. Fig. 44-45. 1921—Among 449 Holstein-Friesian bulls with 2 or more tested daughters in the advanced registry, the author finds that only 48 had daughters whose average was significantly above that of the breed and only 29 had daughters significantly below. He finds that the sires of high producers are slightly more inbred than the sires of low producers, but less inbred than a random group of sires. He concludes that inbreeding to the extent actually practiced is at least not detrimental. A study of the pedigrees of sires of high milkers, sires of low milkers, and random sires indicate that the appearance of an animal in a 4-generation pedigree gives no appreciable indication of true worth as a sire. Similar conclusions are reached with respect to butter-fat percentage. Tables are presented showing the records of sires in considerable detail.—*Sewall Wright.*

3191. GREENE, ELIZABETH. A study of 150 adolescent runaways. 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 413-415. Williams & Wilkins Co.: Baltimore, 1923.—Among the so-called delinquent girls who pass through the Mental Clinic of the New York Probation and Protective Association the largest group is that of the runaways. This group is essentially interesting from a eugenical point of view but is by no means a homogeneous one. Within it are found true wanderers, hyperkinetics, and inadequates.—The statistical facts show a group of young girls, the oldest 23, the youngest 14, who left home for various reasons. The largest number have been factory workers, but they are by no means a defective group. Over $\frac{1}{2}$ fall into the normal or dull normal classes and about $\frac{1}{4}$ are defective. While only $\frac{1}{5}$ are foreign born, a very large group are the children of immigrants, in fact a much larger group than in the general population of New York State.—Most of these girls are adolescents, restless and impatient of authority; yet it seems fairly evident that their wanderings are more dependent upon inherited traits and individual characteristics than upon any other one cause.—*Elizabeth Greene.*

3192. GRIER, N. M. **Variation in the flower of the wild carrot.** (*Daucus Carota* L.) *Torreyia* 22: 64-66. 1922.—Umbels of the wild carrot often show 1 or more purple central florets. Some report these florets always present; others that they occur in 50 per cent of the specimens. Actual count of 6148 specimens shows them present in 1609. The number of purple florets per umbel varies. No genetic studies of the material have been made.—*P. C. Mangelsdorf.*

3193. HARLAND, S. C. **Inheritance of certain characters in the cowpea** (*Vigna sinensis*). *Jour. Genetics* 12: 254. 1922.—Since the publication of his former paper [see Bot. Absts. 3, Entry 1003] the author has obtained from Vilmorin of Paris a cowpea with another type of seed-coat pattern; this type he designates "Very Small-eye." A cross of Small-eye (*dY*) by Very Small-eye (*Dy*) gave, in F_2 , a 9 : 3 : 4 ratio as follows: 9 *DY* (Watson) : 3 *dY* (Small-eye) : 3 *Dy* (Very Small-eye) : 1 *dy* (Very Small-eye). The Small-eye may be regarded as due to a factor *Y*, dominant to its absence. The factor *D* has no effect on seed-coat pattern except in the presence of *Y*, but is also a factor for dark flower color.—*H. N. Vinall.*

3194. HARRIS, J. A., and H. R. LEWIS. **The interrelationship of the egg records of various periods during the first and second year of the White Leghorn fowl.** *Poultry Sci.* 1: 97-107. 3 fig. 1922.—Two-year records on 443 Single Comb White Leghorns in the First International Egg Laying and Breeding Contest of Vineland, New Jersey, are studied. Comparison of correlation coefficients for monthly vs. annual record and for monthly vs. production for the remaining 11 months of the year in 2nd year records in general agrees with similar studies on pullet year records. Regression of annual production of the 2nd year on monthly production of the same year is roughly linear. Second year records may be predicted from 2nd year monthly records with about the same degree of accuracy as pullet year records may be predicted in the White Leghorns.—*F. A. Hays.*

3195. HAYDEN, C. C. **A case of twinning in dairy cattle.** *Jour. Heredity* 13: 22-24. 4 fig. 1922.—A Holstein cow bore 5 sets of twins and 2 singles, the latter females. Her daughter, sister, granddam, and great-granddam each bore 1 set of twins. Of the 9 sets 3 were males and 6 were male and free-martin.—*C. C. Hayden.*

3196. HAYS, F. A. **Inbreeding animals.** Delaware Agric. Exp. Sta. Bull. 123. 44 p., 9 fig. 1919.—Inbreeding Guernsey disclosed no appreciable relation between milk yield, or butter-fat, and the degree of inbreeding. The amount of May Rose breeding seemed to be a more important factor. Experiments in inbreeding swine (108 litters) indicated that inbreeding reduces the certainty of pregnancy, reduces size of litter, increases the death rate at all ages, and reduces the rate of gain after birth (but not birth weight) as compared with outbred or crossbred hogs.—*Sewall Wright.*

3197. HERWERDEN, M. A. VAN. [Dutch rev. of: JOLLOS, V. **Experimentelle Protistenstudien. I. Untersuchungen über Variabilität und Vererbung bei Infusorien.** (Experimental studies on Protista. I. Investigations on the variability and heredity of infusoria.) *Arch. Protistenk.* 43: 1-222. 1921.] *Genetica* 4: 468-470. 1922.

3198. HERWERDEN, M. A. VAN. [Dutch rev. of: MULLER, H. J. **Variation due to changes in the individual gene.** *Amer. Nat.* 56: 32-50. 1921.] *Genetica* 4: 474-475. 1922.

3199. HOLLAND, T. H., and M. K. BAMBER. **Rubber** (investigation at the Peradeniya Experiment Station, Ceylon.) *Tropic. Agric.* 58: 258-263. 1922.—In a study of individual rubber tree yield at the Experiment Station, Peradeniya, trees were grown from Tree No. 2 of Henaratgoda, which has given largest recorded yield of rubber in Ceylon. Ninety trees per acre were grown. Except for air and light, environmental conditions were very similar for all trees. The trees were divided into 4 classes, yielding respectively 5-6, 4-5, 3-4, and 2-3 pounds and containing respectively 7, 42, 76, and 36 trees. Girth was apparently correlated with

yield.—In a study of 2- and 3- day tapping trials percentages of yield of the alternate-day tapping blocks, which were obtained from blocks tapped every third day, decreased in proportion to the increased speed at which the alternate-day tapping reached the base of the tree.—The effect of different fertilizer treatments upon yield of rubber trees is given.—*Walter Scott Malloch.*

3200. HOLLE, G. L. J. *Zaadselectie bij Hevea.* [Seed selection in Hevea.] Arch. Rubbercult. Nederland.-Indië. 4: 392-396. 1920.—Seed from a number of trees of known yield were planted, and all daughter trees large enough tapped at the age of 4 years. Several mother trees of modest yield produced a considerable number of daughter trees of high yield and a number of mother trees of high yield produced daughters with small yields. Cross pollination is blamed for this condition and vegetative reproduction is recommended as a surer means of securing high-yielding trees.—*C. D. LaRue.*

3201. HOLMES, S. J., and J. C. GOFF. *The selective elimination of male infants under different environmental influences.* 2nd Internat. Congress Eugenics. Vol. II. Eugenics in race and state. 233-251. Williams & Wilkins Co.: Baltimore, 1923.—More males than females die in the 1st year of life from nearly all causes. It was found that in countries in which the infant death rate has been reduced, the ratio of male deaths to female deaths increases. This ratio is higher in countries with low infant mortality than in those with high infant mortality. It is higher for legitimate than for illegitimate infants, and in the U. S. A. it is higher for infants of native-born parents than for those of foreign-born parents. It is much higher in whites than in negroes, and it has generally been higher in cities than in the country except in cases in which the rural infant mortality is greater than the urban. All those environmental conditions that decrease infant mortality increase the relative mortality of males as compared with that of females. On the other hand in passing to periods in the development of the individual in which infant mortality is high the ratio of male to female deaths increases. This ratio is higher in the 1st month than subsequently and gradually decreases through the succeeding months of the 1st year and the early years of childhood. It is especially high for still births and higher still for early abortions. These results point to a constitutional inferiority of the male sex that is greatest in early embryos and becomes relatively less in later development and in the years after birth. Natural selection discriminates against the male on the basis of his inherited constitution. But he "is suffered to continue in existence by virtue of a peculiar mechanism of sex determination which insures his continued production." "The way in which natural selection discriminates between the stronger and weaker sex gives us a clue as to how it acts as between the stronger and weaker members of the same sex. With a severe death rate doubtless more of the congenitally weak perish, just as more boys perish than girls under the same conditions. With a mild death rate, a death rate that results from removing, so far as possible, all the external causes of mortality, it is probable that in each sex the death rate is based more strictly on inherent differences of constitution, as it is in the case of the relative mortality of the two sexes. In relation to natural selection, we may say, then, that what the male is to the female, a congenitally weak infant of either sex is to a congenitally strong one of the same sex. If this is true, as infant mortality increases it eliminates a larger number of weaklings, but it becomes less stringently selective. It takes more of the relatively strong along with the weak. With fewer deaths there is less proportionate loss of the strong, and those who perish, despite the improvements of conditions of life, represent a group with relatively low congenital vigor."—*S. J. Holmes.*

3202. HUNT, HARRISON R. *Matrimonial views of college students.* Jour. Heredity 13: 14-21. 1922.—Unsigned questionnaires were returned properly filled out by 63 women and 265 men of the University of Mississippi, from which it is concluded that in general the attitude of the students is morally and eugenically good.—*R. C. Cook.*

3203. HURST, C. C. *The genetics of fecundity in the domestic hen.* 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 212-216. Williams &

Wilkins Co.: Baltimore, 1923.—The report includes 1882 pullet year records with White Wyandottes and White Leghorns. Five pairs of factors influencing fecundity are described: (1) *E*, a dominant factor for early sexual maturity; (2) *W*, a dominant factor for fast winter production; (3) *S*, a dominant factor for fast spring production; (4) *M*, a recessive factor for fast autumn production; (5) *H*, a recessive factor for non-broodiness.—Two pairs of factors affecting egg character are described: (1) *N*, a dominant factor for small egg weight; (2) *C*, a dominant factor for brown egg color. A gross divergence of less than 2 per cent from expected ratios is reported. No sex linkage was discovered in any of the factors.—*F. A. Hays*.

3204. HUTCHISON, C. B. The linkage of certain aleurone and endosperm factors in maize and their relation to other linkage groups. Cornell Agric. Exp. Sta. Mem. 60. 1421-1463. 1922.—Evidence is here presented showing the order of the known genes in 1 chromosome of maize to be *I-C-Sh-Wx* with a very close linkage between *I* and *C*. Tests of different members of the *I-C-Sh-Wx* chromosome group with 5 other recognized groups indicate that this group is independent of the others though with 2 of these there still remains a possibility that it lies in the end region of one or the other. Nine characters not identified with any group as yet were tested with the several members of the *I-C-Sh-Wx* group and found independent of it.—*J. H. Kempton*.

3205. IKENO, S. Vererbungsversuche über die Blütenfarbe bei *Portulaca grandiflora*. [Investigations on flower color in *Portulaca grandiflora*.] Zeitschr. Indukt. Abstamm.- u. Vererb. 29: 122-135. 1922.—This is a résumé of a paper appearing in Jour. Coll. Agric. Imp. Univ. Tokyo 8: Part 1. 1921.—In it are described crosses between plants having orange, yellow red, purple, and white flowers. Orange by white gives orange hybrids, which on selfing give 3 orange to 1 white. Orange by red gives red hybrids, which, when selfed, give 3 reds to 1 orange. Purple by red gives purple, and selfed gives 3 purple to 1 red. Purple by white gives purple hybrids segregating in the ratio of 9 purple: 3 orange: 4 white. Since this is a dihybrid ratio and reds are missing the author concludes that the factor modifying red to form purple is in the same chromosome as the one which modifies orange to form red. Subsequent cultures confirm this hypothesis and show a cross-over ratio of about 15 per cent. The author designates the described factors as follows; *CCrb rb gg* = orange; *CCGG rb rb* = yellow; *CCggRb Rb* = red; *CC gg RB RB* = purple. Four white genotypes are mentioned for 2 of which the following tested formulae are given: white I = *cc rb rb*; white II = *cc RB RB*. White I × orange gives orange which segregates into 3 orange: 1 white. White II × orange gives purple which segregates into 9 purple: 3 orange: 4 white. White III by orange gives orange which segregates into 9 orange: 3 pseudo-white: 4 white. White III and pseudo-white are still under investigation.—*Flora M. Scott*.

3206. JONES, D. F. Selective fertilization and the rate of pollentube growth. Biol. Bull. 43: 167-174. 2 fig. 1922.—The author has previously shown [see Bot. Absts. 6, Entry 1700] that in maize the plant's own pollen is somewhat more efficient in completing fertilization than pollen from plants of a somewhat different genotype, the superiority of self-fertilization being greater as germinal differences increase. He now demonstrates that this selective action is due in part, at least, to differences in rate of pollen-tube growth. All the silks of the ear were trimmed off to an even brush, and a mixture of own and foreign pollen applied, using reciprocal crosses as controls. Thus pollen-tubes would have to traverse a considerably greater distance to reach the lower ovules of the ear than the upper. This resulted in relatively fewer cross-fertilized seed near the base of the ear than near the tip, indicating that own pollen-tubes grow faster than foreign pollen-tubes. The author discusses additional evidence provided by the work of Miller, Balls, Heribert-Nilsson, and Correns. "The discrimination which works against the bringing together of individuals of unlike germplasm has been demonstrated by representatives of four distinct orders in the two main classes of angiosperms."—*Merle C. Coulter*.

3207. JONES, L. R., and J. C. WALKER. **Yellows—resistant cabbage varieties.** Some necessary precautions for seedsmen to consider in the production and distribution of seeds of new special strains. *Seed World* 13: 20–21. 1 fig. 1923.—This serious disease occurs in the central states from Kansas to New Jersey and as far north as central Wisconsin, southern Minnesota, and southern New York. Resistant plants are secured through mass selection from "sick" soil. A high degree of resistance may thus be acquired but it is never absolute; hence continued selection is necessary. Seedsmen are advised to secure stock seed from resistant "mother heads" and to confirm this resistance by trial on "sick" soil before placing such seed in a cabbage seed-growing locality, under proper isolation for 1 generation's increase. The increase crop of seed should be held over for 1 year and its resistant quality proved.—*J. A. Faris.*

3208. KAPPERT, H. [German rev. of: MOL, W. E. DE. **Over het voorkomen van heteroploide variëteiten van *Hyacinthus orientalis* L. in de Hollandsche kulturen.** (The occurrence of heteroploid varieties of *Hyacinthus orientalis* in Dutch cultures.) *Genetica* 3: 97–192. 1921 (see Bot. Absts. 10, Entry 1072).] *Zeitschr. Indukt. Abstamm.- u. Vererb.* 29: 138–139. 1922.

3209. KEITH, A. **Our nearest living relatives.** [Rev. of: GREGORY, WM. K. **The origin and evolution of the human dentition.** xviii + 548 p., 15 pl. Williams and Wilkins Co.: Baltimore, 1922.] *Nature* 110: 834–836. 1922.

3210. KEMPTON, J. H. **Linkage between brachysm and adherence in maize.** *Amer. Nat.* 56: 461–464. 1922.—The loci of the recessive genes for brachytic (short internodes), and for adherent grains, gave, in a progeny of nearly 400 plants from selfed ears, 22 per cent of crossing over. Over 500 plants resulting from a back cross gave, however, 30 per cent. In a 2nd experiment, with a larger number of plants from selfed ears, the crossing over was about 17 per cent.—*John Belling.*

3211. KIRCHNER, O. VON. **Über Selbstbestäubung bei den Orchideen.** [Self-pollination in orchids.] *Flora* 115: 103–129. 1922.—The extent and success of self-pollination is generally underestimated in accounts of orchids. The investigations of the author bring the list of species in which it may occur to 15 for European and 106 for foreign orchids. There are 10 types of orchid flower which permit or necessitate self-pollination. In the majority of cases it results in fertile seed.—*A. G. Stockey.*

3212. KLAPHAAK, PETER J., and H. H. BARTLETT. **A preliminary notice of genetical studies of resistance to mildew in *Oenothera*.** *Amer. Jour. Bot.* 9: 446–458. 1922.—In all 5 strains of *Oenothera* used the eggs differed from the sperms, the former being α gametes, the latter β gametes, except in a few rare cases when metacenic plants are produced. The factor for immunity (*I*) to *Erysiphe Polygoni* DC. is dominant; entering the zygote from either side, the plant produced is immune. The factor for susceptibility is designated by *i*. The genetic constitutions of the 5 strains, with regard to the factors for immunity and susceptibility, and their reactions to the mildew, are as follows: *O. pratincola* hyb. *immunis*, $\alpha i \beta I$, immune; *O. cinerescens*, $\alpha I \beta i$, immune; \times *O. mississippiensis* (called "Cartersville" by deVries), $\alpha i \beta i$, susceptible; "*O. biennis* Chicago" (a strain of *O. pratincola* used by deVries), $\alpha i \beta i$, susceptible; *O. pratincola* ("Lexington C") $\alpha i \beta i$, susceptible. These strains were self pollinated and all possible crosses between them were made. In every case the reaction of the hybrid to the mildew conformed exactly to expectation according to the formulation above, as: *O. pratincola* hyb. *immunis* \times *O. cinerescens*, $\alpha i \beta i$, susceptible. Of the total of 20 hybrids, 13 were susceptible, 3 had a single factor for immunity derived from the maternal parent, 3 had a single factor for immunity derived from the paternal parent, and 1 only had double immunity derived from both parents. Because of the peculiar type of heterogametism, immunity due to a single factor must breed as true as that due to a factor pair. The F_2 generation, by self pollination of the F_1 plants, was like that of the F_1 generation, as would be expected.—*Frieda Cobb Blanchard.*

3213. KIRCHNER, O. VON. Zur Selbstäubung der Orchidaceen. [Self-pollination in orchids.] Ber. Deutsch. Bot. Ges. 40: 317-321. 1922.—A study of living *Listera cordata* R. Br. discloses no self-pollination. The author's assumption concerning autogamy of *Liparis Loeselii* is confirmed. He also confirms H. Müller's notes on self-pollination in *Epipactis microphylla* Sw. Powdery character of pollen makes self-pollination possible. Nectar content and time of beginning of self-pollination distinguished the author's specimens from those described by H. Müller. The author's former notes on self-pollination in *Epipactis latifolia* All. var. *viridiflora* Irm. were opposed to H. Müller's description indicating no self-pollination. A recent description by Zimmermann indicates the possibility of regional differences perhaps of generic value.—*Helen D. Hill*.

3214. KOEHLER, OTTO. [German rev. of: COLLIER, W. A. Einführung in die Variationsstatistik, mit besonderer Berücksichtigung der Biologie. (Introduction to the statistical study of variation with special regard to biology.) 72 p., 8 fig. Julius Springer: Berlin, 1921.] Zeitschr. Indukt. Abstamm.- u. Vererb. 29: 199-200. 1922.—Koehler considers that Collier's book does not go far enough for geneticists accustomed to the use of biometric methods and deals too summarily with its subject for those who need an introduction to such methods. Its principal usefulness, he considers, is in its collection of formulae.—*Sewall Wright*.

3215. LAUGHLIN, H. H. Nativity of institutional inmates. 2nd Internat. Congress Eugenics. Vol. II. Eugenics in race and state. 402-406. Williams & Wilkins Co.: Baltimore, 1923.—This study is the result of a special institutional survey made of the state and federal custodial institutions for all types of the socially inadequate. There was allotted, for each nativity group, a quota based upon its total numbers in the population of the U. S. A. In summarizing the matter for all types of institutions, the following quota-fulfillments in custodial institutions are found: (1) native born, both parents native born, 89.08 per cent; (2) native born, 1 parent native born, 1 parent foreign born, 120.60 per cent; (3) Native born, both parents foreign born, 104.28 per cent; (4) Foreign born, both parents foreign born, 134.42 per cent. This seems to indicate that on the whole the recent immigration is not so sound as the older, and that in order to select immigrants of greatest value, it will be necessary to select on the basis of family stocks as well as individual merit.—*Harry H. Laughlin*.

3216. LAUGHLIN, H. H. Present status of eugenical sterilization in the United States. 2nd Internat. Congress Eugenics. Vol. II. Eugenics in race and state. 286-291. Williams & Wilkins Co.: Baltimore, 1923.—Fifteen states have enacted laws in reference to eugenical sterilization. The main theme of these statutes is eugenical rather than punitive. The individual laws vary greatly in the details and extent of applicability. The result is that several of the statutes were declared unconstitutional because running counter to certain provisions of the Bill of Rights. Others, more carefully drawn, were sustained by the courts, particularly when punishment was not involved. Prior to Jan. 1, 1921, thousands of persons had been legally sterilized under the laws in the several states, notably in California. Eugenical sterilization is shown to be legally possible, and its application awaits only the demand for and the enactment of suitable legislation. A descriptive and statistical chart is appended.—*Harry H. Laughlin*.

3217. LAUGHLIN, H. H. The science and the practical application of eugenics. Jour. Heredity 13: 93-96. 1 fig. 1922.—This paper sets forth the 2 phases of eugenics,—the science and the practical application. An outline is given of the present and, if current tendencies continue, of future coordination between the underlying principles of eugenics and its practical application by families and nations. A short history of Galton's coinage of the word 'eugenics' is included. There is given also an explanation of the diagrammatic scheme, showing the relation of eugenics to other sciences. This appears as an explanation of the text figure, which originally was printed on each certificate awarded to exhibitors by the Second International Congress of Eugenics. The paper concludes with an exposition of the likenesses and differences between plant and animal breeding on the one hand and eugenics on the other. It shows that

in both systems the underlying biological principles are the same, but that whereas in breeding plants and animals, mankind does not consider the elements of love, courtship, and fidelity; in eugenics, mate selection and elimination of defectives must observe the most considerate regard for morality and the highest social order. Research and education are the 2 keys to the science and practice of eugenics.—*H. H. Laughlin.*

3218. LÉCAILLON, A. Sur les caractères d'un hybride mâle provenant de l'union d'un Canard Pilet mâle (*Dafila acuta* L.) et d'un Canard sauvage femelle (*Anas boschas* L.). [Concerning the characters of a hybrid male resulting from the mating of a male pintail duck with a female wild duck.] *Compt. Rend. Acad. Sci. Paris* 174: 885-887. 1922.—The females of the 2 species are very similar, but the males are easily distinguished. The species can be crossed without difficulty. The male hybrid obtained in 1920 showed some male pintail, some wild male, and some intermediate characters, analogous to the results in a male hybrid of duck called "musqué" and Egyptian goose. The characters used were color, color pattern, and tail form.—*Helen D. Hill.*

3219. LEGRAND, LOUIS. A simple explanation of the hereditary mechanism. 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 129-137, 3 diagr. Williams and Wilkins Co.: Baltimore, 1923.—An attempt is made to explain the constitution of the hereditary mechanism and its operation in development. A distinction is made between fixed characters, which are exhibited by all members of a species or larger group, and unfixed ones, which vary among individuals and from generation to generation. Fixed characters have their basis in the cytoplasm, unfixed in the nuclei. The unfixed plasmas (nuclei) are further subdivided into racial, ancestral, and individual portions, and their degree of fixity is supposed to depend upon the extent of the zone of contact with the cytoplasm. Latency and recessiveness are due to exclusion of elements from this zone, and sex depends upon the relative area of contact of female and male nuclear contributions. This organization of the cell is preserved throughout development, and the interactions "between both sorts of plasmas, their contacts, their mode of attraction and fixation, are therefore what constitutes life."—*R. E. Clausen.*

3220. LESAGE, PIERRE. Sur la persistance des caractères provoqués par la salure. [On the persistence of characters induced by saltiness.] *Compt. Rend. Acad. Sci. Paris* 176: 257-260. 1923.—Pot cultures of *Lepidium sativum* were grown continuously from 1911 to 1922, one series being watered continuously with normal water and the other with seawater. These were compared for height of plant, number and weight of seeds produced, shape of seed as obtained by dividing the length by the breadth, etc. The sea water cultures proved much less vigorous. A comparison, under uniform conditions from 1916 to 1921, was made of the check series and cultures obtained from sowing seed saved from the plants watered with salt water and also from seed saved from cultures 1 generation removed from the salt water treatment. There was a slight apparent persistence in the characters which appeared as a result of the salt water treatment.—*H. K. Hayes.*

3221. LEWIS, FREDERICK T. A note on symmetry as a factor in the evolution of plants and animals. *Amer. Nat.* 57: 5-41. 13 fig. 1923.—The author attempts to show that there is a special tendency to produce symmetrical forms in nature, and that departures from symmetry are perhaps transient phases destined to be replaced by some other type of symmetry. He discusses at length flora structure and deviations in *Campanula*, and concludes that the tri-carpellate *Campanulas* are peculiarly variable on account of an imperfectly symmetrical arrangement and that the principal types centering around it represent attainments of more symmetrical and sometimes more stable forms, such as are seen in *Campanula medium*, *Platycodon*, *Canarina*, *Michauxia*, *Phyteuma*, and *Jasione*. He then discusses symmetry in the aortic arches, particularly on the basis of studies of sheep embryos made in collaboration with G. H. Jackson, Jr., which show that an early symmetrical arrangement is soon lost as development proceeds, and ultimately passes into a very different arrangement which is nearly sym-

metrical. Normal and variant conditions in other mammals are described, and the relation of veins to corresponding arteries is considered briefly. Probable trends of evolution on the basis of attainment of more symmetrical arrangements are pointed out. In the disposition of the principal viscera he shows that the adult condition is reached by a dextral rotation from an early bilateral condition. The general conclusion is reached that nature is ill at ease in the presence of asymmetry; and that when one condition of symmetry is lost, another may arise from it. In a postscript he contrasts his ideas with those of Conklin.—*R. E. Clausen.*

3222. LILLIE, FRANK R. **Supplementary notes on twins in cattle.** *Biol. Bull.* 44: 47-78. 13 fig. 1923.—Various points regarding the free-martin left somewhat indefinite in a former paper are here discussed in the light of additional data. (1) Two additional cases of 2-sexed twins where female is normal are described. In these there is no vascular anastomosis between chorions. (2) The sex-ratios of twins, counting free-martins as females, turns out to be essentially that of species, i.e., about 120 males to 100 females. (3) One case of possible monozygotic twinning was found. Only 1 corpus luteum was present, but there may have been 2 ova in 1 follicle. (4) The degree of modification of a free-martin is not in proportion to size of vascular connection, some of the smallest connections giving the largest modification, and vice versa; it is a case of an "all-or-none" reaction. (5) In a previous paper, seminal vesicles in foetal free-martins were overlooked [see *Bot. Absts.* 1, Entry 1260]. More careful dissection shows them to be almost always present. (6) The earliest stage of the free-martin which was found is 3.75 cm. long. It is already extensively modified and must have begun to change not later than at the 3.0 cm. stage. The earliest appearance of sex differentiation of testis is at 2.5 cm. stage. The onset of change in free-martin coincides closely with differentiation of testis of male twin. (7) A general discussion considers Minoura's experiments on fowls, Keller and Tandler's work on cattle and goat twins, Hartman's "reciprocal free-martins," and Doncaster's interpretation of tortoise-shell tomcat.—*H. H. Newman.*

3223. LITTLE, C. C. **The inheritance of a predisposition to cancer in man.** 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 186-190. Williams & Wilkins Co.: Baltimore, 1923.—Tabulation of family histories on file at the Eugenics Record Office of the Carnegie Institution of Washington show that there is clear evidence for the inheritance of a predisposition to formation of "cancer" in man. For this analysis all types of malignant tumors are lumped together under the term "cancer." The influence of inheritance is shown by the occurrence of a marked excess of "cancerous" individuals, over rate of general population, in (1) sibs of "cancerous" individuals, (2) progeny of "cancerous" mothers by non-cancerous fathers, (3) progeny of non-cancerous mothers by "cancerous" fathers. The fact of inheritance is clear, but the type of inheritance needs further investigation. It does not appear to be simple Mendelian inheritance. This does not, however, preclude possibility that it will be found to be dependent upon multiple Mendelizing factors.—*C. C. Little.*

3224. LOTSY, J. P. **Interspecific sterility.** *Nature* 110: 843. 1922. Comment on Bateson's letter. [*Nature* 110: 76: 1922.]

3225. LUSH, JAY L. **Hereditary notch in the ears of Jersey cattle.** *Jour. Heredity* 13: 8-13. 9 pl. 1922.—A sire is reported with a peculiar notch in the under side of the ear, which looks like a "cropped ear," used by stockmen as a mark. Many of his calves are born with similarly notched ears; it is not known whether his sire or dam had this mark. The manner of inheritance indicates that it is a single dominant factor, independent of sex. The notches in the ears of the calves are of all sizes, from that of the sire's to a slight flattening of the lower side. The importance to genetics of studying non-economic characters is commented on.—*R. C. Cook.*

3226. McCLUNG, C. E. **Evolution of the chromosome complex.** 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 65-75. Williams & Wilkins Co.: Baltimore, 1923.—The author indicates that the chromosome theory of heredity now serves the biologist much as the atomic theory does the chemist. All facts bearing upon chromosomes are,

therefore, of great importance. He points out, accordingly, the significant facts derived from extensive studies by his students and himself upon most of the North American species of the orthopteran family Acrididae. The great precision and definiteness of chromosome organization in this group is indicated by the fact that a common number is almost universal. Apparent variations are explainable and serve only to strengthen the conception of constancy. From this it follows that the members of a complex in any species are individually homologous with those of any other, and that all have been derived by direct descent from earlier members of this ancient family.—Generic and specific differences of form, size, structure, and behavior are noted and confirm the theory of chromosome individuality. The significance of these facts in ontogenetic, phylogenetic, and taxonomic studies is indicated. An ultimate analysis of factorial differences upon a physiological basis is suggested.—*C. E. McClung.*

3227. MALLOCH, WALTER SCOTT. Value of the hemp plant for investigating sex inheritance. *Jour. Heredity* 13: 277-283. 1922.—Its relatively low chromosome number (10 haploid), ease of hybridization, large number of seed produced, adaptation to field and greenhouse conditions, and possibility of a large number of variations, suggest hemp as a plant particularly adapted for an investigation of sex inheritance. A simple leafed form and a sectorial chimera are described. Criticism is offered of Schaffner's explanation of sexuality in hemp.—*Walter Scott Malloch.*

3228. METZ, C. W. Chromosome studies on the Diptera. IV. Incomplete synopsis of chromosomes in *Dasyllis grossa* Fabr. *Biol. Bull.* 43: 253-266. 2 pl. 1922.—Cytological study of *Dasyllis* indicates that in the male, and perhaps in the female, 3 of the 5 pairs of chromosomes undergo synopsis only at their ends, the median portions not fusing at all during the growth stages. Possible bearing on cases of inherited decrease or absence of crossing over is discussed.—*A. H. Sturtevant.*

3229. MOORE, C. R. On the physiological properties of the gonads as controllers of somatic and psychical characteristics: V. The effects of gonadectomy in the guinea pig, on growth, bone lengths, and weight of organs of internal secretion. *Biol. Bull.* 43: 285-312. 1 fig. 1922. The author studied growth curves of normal males and females, castrated males, and spayed females. The animals were killed when 360 days old; thyroids, hypophysis, adrenals, and spleen were weighed, and femora, tibiae, and fibulae measured. For all characters studied there was sufficient variability within each series to show that small numbers of individuals cannot give reliable results. There was apparently a slight effect of gonadectomy on most of the characters studied; the only striking results were that gonadectomy causes a distinct decrease in weight of adrenals in both sexes, and a clear increase in bone length in females.—*A. H. Sturtevant.*

3230. MORGAN, T. H. The bearing of Mendelism on the origin of species. *Sci. Monthly* 16: 237-247. *Illus.* 1923.—In this general discussion of the evidence which genetics offers on the origin of species, the author points out that the species concept may in certain cases be incapable of genetic interpretation, and that different systems of classification may be desirable for taxonomists and evolutionists. He argues that the evidence of Mendelian inheritance in domesticated animals and plants, and the fact that mutant characters arising under observation obey Mendelian laws, indicate that mutants have furnished the basis for artificial selection. He states that mutants may give rise to minute differences as well as large ones and that the former, now accurately distinguishable by pedigree culture methods from non-heritable fluctuations, may provide the material for organic evolution. He calls attention to the multiple effects of changes in single genes and argues that the more deep seated physiological effects may be the basis of selection. The relatively trivial superficial characters associated with these changes are seized upon as species criteria by taxonomists. He rejects the view that mutations represent losses of germinal material, and that dominance relations are of vital significance in the interpretation of the evolutionary value of mutations. He shows that crossability and the sterility of interspecific hybrids may depend upon a variety of circum-

stances, that sterility of F_1 hybrids cannot be expected to arise in the manner stipulated by Bateson, "the production of an indubitably sterile hybrid from completely fertile parents, which have arisen under critical observation from a common origin," but that attention should be focused upon the origin of differences which tend to interfere with normal conjugation of chromosomes. He describes the evidence from parallel mutation in different species, and argues that it indicates that mutation is not wholly a random process.—*R. E. Clausen.*

3231. MULLER, H. J. **Mutation.** 2nd Internat. Congress Eugenics Vol. I. Eugenics, genetics and the family. 106-112. Williams & Wilkins Co.: Baltimore, 1923.—Since the theory was proposed by Muller (1917), and is being proved by Shull (1921), that so-called "mutations" in *Oenothera*, when not chromosome aberrations, are really cases of crossing over of genes linked with the balanced lethals there, it becomes necessary to rebuild the whole theory of mutation, discarding the ideas based on *Oenothera* work and founding the theory instead upon those cases in *Drosophila* and elsewhere which can be proved to consist of changes in the genes themselves. The newer data already give evidence of at least 14 proximate principles, which, taken collectively, may be considered to constitute the new theory of mutation: (1) most genes have an extremely high stability, probably greater than that of radium atoms; (2) certain genes, however, are vastly more mutable than others; (3) external agents cannot ordinarily increase mutability enough to cause obvious "production" of mutations; (4) losses of genes occur, but not all mutations are losses; (5) a given gene can mutate in different directions, and its different mutations may even affect different characters, but (6) its mutations occur preferentially, being oftener in certain directions and magnitudes; (7) its stability and preferential direction may become altered through mutation; (8) mutation usually occurs in only 1 kind of gene at a time, and (9) in only 1 allelomorph; (10) mutation may occur at almost any time during the life-history; (11) the mutant genes tend to be recessive; (12) most mutations are deleterious in their effects; (13) visible variations caused by mutation are oftener small than large, and the smaller changes usually have greater survival value; (14) most mutations produce changes either too small to be visible or too large to be viable.—It is especially important now to obtain data upon the rate and kinds of mutations, as affected by various internal and external conditions. Such data, obtained by Muller and Altenburg (1919, 1920) for *Drosophila* under normal conditions, already give results of interest for evolutionists and eugenisists—indicating necessity of periodic inbreeding, accompanied by selection, to prevent permanent stoppage of evolution through accumulation of lethal factors.—*H. J. Muller.*

3232. MYERSON, A. **Inheritance of mental diseases.** 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 218-225. Williams & Wilkins Co.: Baltimore, 1923.—There is no such entity as insanity, and the various mental diseases have different biological relationships. Thus the important disease, general paresis, has the relationship of syphilis; the organic diseases of the brain, especially the important group due to arterial disease, have the relationship of arterio-sclerosis. There is much evidence to show that these diseases are as common in normal families as in the abnormal. The situation in regard to feeble-mindedness and epilepsy is exactly the same, i.e., there is no entity feeble-mindedness and no entity epilepsy. Each type of feeble-mindedness and each type of epilepsy has to be considered in its familial relationships by itself.—Certain types of mental diseases show interesting and important familial relationships. The paranoid diseases, dementia praecox and manic depressive insanity, occur frequently in members of the same family group. Cases are cited to show the transition in type of mental disease which occurs from generation to generation, and also to show the types of mental diseases that occur amongst brothers and sisters. Statistics are cited to show that certain types of mental disease such as dementia praecox tend more or less to eliminate themselves because of the great reduction in the marriage rate of the individuals suffering from these diseases. The author believes that in the mental diseases which run in families, heredity of the type involved in the color of hair and eyes is not present, a germplasm injury or deviation is operating, and the matter is one for clinical medicine rather than for statistician or the biologist.—*A. Myerson.*

3233. NACCARATI, SANTE. The morphologic characteristics of psychoneuroses. 2nd Internat. Congress Eugenics. Vol. II. Eugenics in race and state. 330-340. Williams & Wilkins Co.: Baltimore, 1923.—The author, following the methods of Viola in the differentiation of the morphologic types, has found that psychoneurotics are encountered more frequently among the 2 opposite types, viz., microsplanchnic and macrosplanchnic. Normosplanchnic individuals are less likely to become psychoneurotics if put under unfavorable environmental conditions. His study made on 100 Italian psychoneurotics has also shown that microsplanchnic subjects tend to develop the asthenic forms of psychoneurosis, whereas macrosplanchnics tend to develop the emotional types of psychoneurosis. From the eugenic point of view the author warns against marriage between individuals possessing the same morphological defects, as the offspring is likely to be neurotic. From the social and hygienic standpoint he warns individuals presenting macrosplanchny and microsplanchny in excess to avoid occupations and happenings requiring unusual mental and physical strain. This precaution might have reduced the number of so-called "functionally disabled" during the war.—*Sante Naccarati*.

3234. NACHTSHEIM, H. [German rev. of: (1) RIMSKY-KORSAKOW, M. *Beobachtungen über Variabilität und Vererbung bei den Schlupfwespen*. (Observations on variation and heredity in ichneumon flies.) Arb. Naturf. Ges. Petersburg 51: 89-111. 1920. (2) WHITING, P. W. (a) Rearing meal moths and parasitic wasps for experimental purposes. Jour. Heredity 12: 255-261. 1921. (b) Heredity in wasps. A study of heredity in a parthenogenetic insect, the parasitic wasp, *Hadrobracon*. Jour. Heredity 12: 262-266. 1921. (c) Sex-determination and biology of a parasitic wasp, *Hadrobracon brevicornis* (Wesmael). Biol. Bull. 34: 250-256. 1918. (See Bot. Absts. 1, Entry 53). (d) Studies on the parasitic wasp, *Hadrobracon brevicornis* (Wesmael). I. Genetics of an orange-eyed mutation and the production of mosaic males from fertilized eggs. Biol. Bull. 41: 42-54. 1921. (See Bot. Absts. 11, Entry 365). (e) Studies on the parasitic wasp, *Hadrobracon brevicornis* (Wesmael). II. A lethal factor linked with orange. Biol. Bull. 41: 153-155. 1921.] Zeitschr. Indukt. Abstamm.- u. Vererb. 29: 89-92. 1922.—Wing-length in *Prestwichia aquatica*,—an ichneumon the larvae of which parasitize eggs of the water beetle, *Dytiscus*,—is a sex limited character, being short in all males, but in females either long ("macropterous"), or short ("brachypterous"). The males arise from unfertilized eggs. It was found by Rimsky-Korsakow that macropterous P₁ females, crossed by males from brachypterous stock, yielded macropterous daughters. These F₁ females, back crossed to males from the recessive brachypterous stock, yielded macropterous and brachypterous female segregants; backcrossed to males from the dominant macropterous stock their daughters were all macropterous. The reciprocal P₁ cross yielded macropterous F₁ females, as expected, in 1 of the 5 attempted crosses, but in the 4 others brachypterous daughters appeared, which bred true to type. The exceptions are perhaps not surprising in view of the admitted difficulty of obtaining virgin females (copulation occurred within the *Dytiscus* egg and isolation of pupae was usually necessary). *Prestwichia solitaria* lays its eggs in Odonata eggs, is brachypterous, and, unlike *aquatica*, has no dark tip on the abdomen. Only 1 of 11 crosses with *P. aquatica* attempted by Rimsky-Korsakow succeeded. In this, a cross of *P. solitaria* ♀ by *P. aquatica* ♂, F₁ females were produced that possessed the instinct of laying in *Dytiscus* eggs, that had moderately long (variable) wings, and dark tipped abdomen. (The haploid brothers produced at the same time were of course light tipped, and, like all *Prestwichia* males, brachypterous.) The F₁ females, backcrossed to the recessive *P. aquatica*, yielded female segregants of the 2 opposite types with regard to laying habits, and also with regard to abdomen coloration, and having variable wing length. The F₁ females backcrossed to *P. solitaria* gave females showing only the characters of *P. solitaria*. The males from both backcrosses were of both dark and light tipped types.—The author reviews Whiting's experiments with the wasp *Hadrobracon brevicornis*, parasitic on the mealworm. The reviewer points out that this form is much more favorable for genetic work than *Prestwichia*, and says that he can fully corroborate Whiting's account of breeding methods, on the basis of his own experiments now under way. He describes breeding methods, influence of environment, sex-linkoid inheritance of orange eye (due to males arising from unfertilized eggs) and of the linked lethal factor, and mosaic males apparently arising from nonfusion of parental pronuclei.

He anticipates that further significant facts will soon be forthcoming in explanation of these "most unique hereditary relationships" existing in this "ideal object."—*H. J. Muller.*

3235. NICHOLSON, C. **Crimson cowslips.** Gard. Chron. 69: 301. 1921.—No reference is made in the text to crimson cowslips, but a discussion occurs of characters of hybrids, natural and artificial, between the cowslip, oxlip (*Primula elatior*), and wild *Primula*. Particular reference is made to caulescent forms.—*L. L. Burlingame.*

3236. NOYES, HILDA H., and GEORGE W. NOYES. **The Oneida Community experiment in stirpiculture.** 2nd Internat. Congress Eugenics Vol. I. Eugenics, genetics and the family. 374-386. Williams & Wilkins Co.: Baltimore, 1923.—Noyes first published his views regarding human "stirpiculture" in February, 1849. For 27 years after its foundation the Oneida Community could not undertake an experiment in scientific propagation, but in 1868 it found itself in a situation favorable for such an experiment. About 100 men and women took part, of whom 81 became parents. Fifty-eight living children were born. The Oneida Community was a product of successive selections, some of the resulting characteristics of the group being hardiness, longevity, native ability, faculty of agreement. The standard of character aimed at was one in which (1) the spiritual, (2) the intellectual, (3) the moral, and (4) the physical departments of human nature were developed to the fullest extent compatible with the above stated order of precedence. The experiment was directed by a Committee of "central members," Noyes himself exercising the preponderating influence. In a majority of cases application was made to the Committee by couples desiring to become parents, and the degree of selection exercised was considerable. The death-rate among the 81 selected parents was 22.5 per cent less than that of the group as a whole. The children received exceptional care, and at the reorganization of the Community as a joint-stock company on January 1, 1881, the women and children were amply provided for.—Some of the outstanding results of the experiment are (1) no mothers were lost during the experiment from causes directly or indirectly due to childbirth; (2) no deaf and dumb, blind, crippled, or idiotic children were born; (3) of the 58 stirpicultural children, born 1869-1879, 52 were living on September 26, 1921.—*H. H. Noyes and G. W. Noyes.*

3237. OCCHIALINII, ODDO. **Deux nouvelles variétés de Gardénia.** [Two new varieties of *Gardenia*.] Rev. Hort. 95: 274-276. 1923.—Two new varieties of *Gardenia* produced by Guido Mariotti, of Nervi (Italy), by artificial fertilization are minutely described. The noteworthy characteristics of each variety are emphasized and their flowers are illustrated.—*Richard Wellington.*

3238. OVEREEM, CASPAR VAN. **Über Formen mit abweichender Chromosomenzahl bei *Oenothera*.** [On *Oenotheras* with varying chromosome numbers.] Beih. Bot. Centralbl. Abt. I. 39: 1-80. 15 pl. 1922.—Reduction divisions in *Oenothera Lamarckiana semigigas* give fertile gametes only when 7 or 14 chromosomes are present. Variation in the normal chromosome numbers always gives variation in habit and structure and a definite form always carries the same chromosome number. Pollen of forms with 15 chromosomes is identical with that of the mother species since gametes with 8 chromosomes break down. Forms with varying chromosome numbers are the products of definite chromosome combinations. Variation in somatic counts was not found and fragmentation of chromosomes, if present, are believed to be artifacts. Although the chromosomes of *Oenothera* differ only slightly in form and size it is possible to detect differences. *O. Lamarckiana lata* shows unmistakable *gigas* characters in contrast to other forms with 15 chromosomes. *O. Lamarckiana gigas* is cytologically and anatomically a double *Lamarckiana*; it is not constant when selfed and its variation rests on a cytological basis. Hybrids of *gigas* are not uniform and as triploid forms are not constant. The appearance of 2 forms, *O. bienniformis* and *O. de Vriesii*, with typical *biennis* characters from a race of *Lamarckiana* gives a new argument for the theory of Davis that *O. Lamarckiana* of de Vries is a hybrid with some *biennis* form in its ancestry. Both of these forms are constant, although

complicated hybrids, and breed true because sterility, both zygotic and gametic, eliminates the possibility of variants from the types. A very full *Oenothera* bibliography is included.—*B. M. Davis.*

3239. [PALMER, E. F., Director.] [Plant breeding in] Rept. Hort. Exp. Sta. Vineland Sta. Ontario 1919: 8-22. 1921.—In the peach breeding work [PALMER, E. F., and F. S. REEVES p. 8-13] all of the earlier seedlings were rigidly culled and only the very best and most promising ones, constituting about 1 per cent of the total number, were retained for further study and possibly for distribution. Yellow flesh \times white flesh gives white flesh. Yellow flesh color is recessive. St. John, Fitzgerald, Elberta, Millionaire produce seedlings very true to type except in season of ripening and adhesion of flesh to stone. In this breeding work a large tent covering the entire tree was used. It was observed that cheese cloth gave better results than cotton fabric because it let in more light and air and yet was sufficiently dense to give a desirable shade or protection from the hot sun.—From the strawberry breeding work which involved several thousand individuals, 27 constitute the final selection and these will be further tested.—The raspberry and blackberry breeding work for 1919 consisted of selfing and crossing species and varieties and the taking of notes regarding the questions of self-fertility and self-sterility.—The cucumber breeding work is a continuation of previous efforts to secure a green house strain that will set a large number of fruits without the aid of artificial pollination. Three varieties, viz., Suttons Everyday, Princess and Davis Perfect were used in the parentage. A strain that seems very promising has been isolated and if by further testing this strain proves sufficiently profitable and stable it will be given to the public for a wider trial.—The sweet corn breeding has only recently been started. The experiment involves five garden varieties, viz., Golden Bantam, Charlevoit, Cooke, Stowells Evergreen and Black Mexican.—*L. R. Detjen.*

3240. PARHON, C. J., and C. [PARHON]. A pseudohermaphroditic cock. *Endocrinology* 6: 383-386. 1922.—A bird described as a hen that laid eggs and crowed but never brooded was autopsied. The plumage was female and the comb and wattles were male-type. An oval body somewhat lobulated was found on the right side at level of the genital glands. Its structure was testicular and active spermatogenesis was discovered. A tri-lobed body occupied the left side. This body resembled a testis in microscopic sections. Structures resembling the oviduct of a hen were found on both right and left sides. No ova were discovered. The adrenals were normal. The thymus was well developed. The thyroids were the size of a lentil. Broodiness is thought by these writers to depend on endocrine modifications.—*F. A. Hays.*

3241. PAYNE, F., and MARTHA DENNY. A gynandromorph in *Drosophila melanogaster*. *Amer. Nat.* 56: 383-384. 1922.—In the F_2 of a cross of a yellow white female by a garnet male appeared a mosaic individual with 1 garnet and 1 white eye. It was male throughout and fertile, and genetic tests proved that all its germ cells were white garnet. Two possible explanations are given: (1) the garnet eye was derived from a cell in which during somatogenesis the white gene either mutated to red or was lost or inactivated; (2) the mosaic individual was derived from a binucleated egg-cell fertilized by 2 Y-bearing sperm.—*Alexander Weinstein.*

3242. PEAKE, H. J. E. The study of man. *Nature* 110: 516-521. 1922.—The contrast is pointed out between the "evolutionary school" and the "historical school" of anthropology, both believing in evolution, but the latter assuming that a given culture complex evolves but once and is subsequently transmitted from one people to another. The modern tendency is not to assume an independent origin for any custom until it has been proved that such could not have been introduced from some other area.—An increasing interest of sociologists and economists in anthropology, which is defined as "the study of the origin and evolution of man and his works" and considered as a department of zoology, is noted. The ways in which backward peoples are studied have great value for the anthropologist. "The time seems to have arrived when anthropologists should not concentrate so exclusively upon these lowly cultures, but might carry on their researches into those civilizations which have advanced further in their evolution." Great need exists for anthropological studies in China, Japan,

and India. Such studies by Indian and British students would tend to lessen the gap between these 2 peoples. Evil results of lack of anthropological point of view are noted on both sides. A renewed plea is made for a full training in anthropology for candidates for the Indian civil service. The need for an institution in India, similar to those at Athens and Rome, for post graduate study in Indian problems, is pointed out. The urgency of the anthropological problems in the near East is emphasized, as also the value of anthropological factors in efforts towards mutual understanding in connection with the League of Nations and Versailles Treaty. There is also need for anthropological study of Christendom, including the British Isles. Much of the ill feeling engendered everywhere in the world is the product of misunderstanding due to a lack of the anthropological point of view.—*William K. Gregory.*

3243. POPENOE, PAUL. *Eugenics and Islam*. 2nd Internat. Congress Eugenics. Vol. II. Eugenics in race and state. 443-448. Williams & Wilkins Co.: Baltimore, 1923.—This paper discusses beliefs and practices of Arabs thought by the author to be of eugenic value. They include sound ideas of the importance of heredity and genealogy, consanguineous marriage, emphasis on necessity of marriage and parenthood, and subsidies distributed by religious foundations to the superior part of the population. On the dysgenic side, war, slavery with accompanying concubinage, and indiscriminate charity are mentioned. Polygamy is held to operate both eugenically and dysgenically.—*Paul Popenoe.*

3244. POPENOE, PAUL. *Twins raised apart*. Jour. Heredity 13: 142-144. 1 fig. 1922.—An account is given of the lives of 2 girls, evidently identical twins, who were separated at an early age. In his summary the author states that "When 2 individuals are separated in infancy, brought up as differently as were the twin sisters described above, and still manifest such mental similarities, it is impossible to resist the conclusion that the psychical make-up of the individual is very largely settled by the time he is born."—*R. C. Cook.*

3245. POPENOE, WILSON. *The tree Dahlia of Guatemala*. Jour. Heredity 11: 265-268. 1920.—Four types of tree Dahlias are found in Guatemala; single and double-flowered whites and single and double pinks are most common. Climatic conditions have hitherto restricted the growing of these plants to warmer regions. They are however so variable that the author thinks they would offer the nurseryman excellent material for experimental breeding. They attain a height of 15-18 feet and have beautiful flowers 4-5 inches in diameter.—*Edith Lang.*

3246. PRASAD, RAM. *Note on the probability of an inter-relation between the length of of the stigma and that of the fibre in some forms of the genus Gossypium*. Agric. Res. Inst. Pusa Bull. 137. 7 p., 1 pl. 1922.—A yellow-flowered variety of cotton, improved by selection, was found to have become contaminated by accidental hybridization with a white-flowered variety having shorter fiber. Yellow being dominant, roguing on basis of petal color was impracticable. The presumable heterozygotes, having yellow flowers and short fiber, were found to have also shorter stigmas. Several varieties and strains of Asiatic and American cottons were then examined and a general correlation between varietal means for stigma length and fiber length was detected.—*T. H. Kearney.*

3247. PRING, G. H. *A new hybrid Nymphaea*. Ann. Missouri Bot. Gard. 9: 325-327. Pl. 20-22. 1922.—The new fertile hybrid named "Mrs. G. H. Pring," Pring was obtained from the cross *N. ovalifolia* × *N. "Mrs. Edwards Whitaker."*—*J. Ben Hill.*

3248. REUTER, M. *Hermaphroditismus beim Wild*. [Hermaphroditism in game.] Zeitschr. Forst.- u. Jagdw. 53: 669-685. 1921.—A general discussion is presented amplified with examples of hermaphroditism in game animals and in feathered game.—*J. Roesser.*

3249. RICHMOND, I. J. *A. N. Jones—plant breeder*. Jour. Heredity 13: 103-107. 4 fig. 1922.—An account is given of the plant breeding work of A. N. Jones, Batavia, New York. The ancestry of many of Jones' wheat hybrids and a short note on his work in bean breeding

are included. Vegetative propagation of wheat by root separation was practiced by Jones to increase his stock of valuable forms. Thus, from a single grain planted in July, 1888, he harvested 27.5 pounds of wheat the following summer.—*R. C. Cook.*

3250. ROBBINS, RAINARD B. **Selection through the choice of seeds from dominant plants of an allogamous population.** *Genetics* 7: 508-512. 1922.—The author considers the problem of selection involved in choosing seed from plants showing a certain dominant character, while no effort is made to influence the source of pollen.—*Merle C. Coulter.*

3251. ROSANOFF, AARON J. **Inheritance of mental disorders.** 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 170-173. Williams & Wilkins Co.: Baltimore, 1923.—The following facts concerning the inheritance of mental disorders are considered: (1) heritable nature of certain mental disorders; (2) atavistic heredity; (3) dissimilar heredity; (4) constitutional mental disorders behave like Mendelian recessives in their manner of transmission by heredity; (5) clinically distinguished entities bear to one another and to normal mental states some sort of relationship, as shown particularly by so-called transitional, mixed, and borderline cases; (6) each clinical entity represents a mental trait or group of traits varying quantitatively within wide limits; (7) each seems to present possibilities of qualitative variation which has led clinicians to the conception of neuropathic equivalents; (8) each mental trait, as exhibited by the clinical entities, seems to present 2 aspects for consideration, a temperamental aspect, whereby it is qualitatively distinguishable from other traits, and an intellectual aspect, which is not specific for a given trait and which seems to vary only quantitatively. Some problems in eugenics in relation to mental disorders are briefly discussed. One of the most urgent tasks of fundamental research is judged to be the devising of methods for the more precise measurement of temperamental traits.—*Aaron J. Rosanoff.*

3252. SADLER, WILLIAM S. **Endocrines, defective germ-plasm, and hereditary defectiveness.** 2nd Internat. Congress Eugenics. Vol. II. Eugenics in race and state. 341-350. Williams & Wilkins Co.: Baltimore, 1923.—The present status of opinion in America regarding the relative frequency of defective germ plasm and disturbances of the functions of the internal secretory glands as the cause of mental defectiveness, social delinquency, and certain of the insanities is discussed. Is dementia praecox an inheritance or an acquirement? The relation of this, the chief form of insanity, to disturbances of the endocrine system of the body is reviewed. A consideration is given as to what extent the dullards and backward children of this and the next generation may expect to find relief and help in the administration of hormones or ductless gland substances from the lower animals and to the fact that mental defectiveness and other hereditary abnormalities are so frequently associated with disfunction of some sort in the endocrine system. The author then treats of the relation of hormones in prenatal life to deformity and the possible inheritance of acquired characters, and a discussion of Guyer's recent work in this connection. Consideration is given to alcohol and syphilis in their possible rôle as racial poisons in relation to apparent inherent defectiveness. Suggestions are made for further research and experimental inquiry as to the rôle of the hormones of the endocrine system in relation to hereditary defectiveness.—*William S. Sadler.*

* 3253. SALAMAN, REDCLIFFE N. **The influence of size and character of seed on the yield of potatoes.** *Jour. Agric. Sci.* 12: 182-196. 1922.—Potato seed pieces of different sizes, (26, 12, 8, 6, 4, and 3 pieces per pound, mixed unselected, and pieces with outgrowths of various sizes), were planted on the checker-board system. The yield data are carefully analyzed, from which it is concluded that the total yield of potatoes varies directly with the weight of the seed piece. Seed pieces of 2 ounces in weight were the most remunerative. There is no correlation between the presence of secondary growth in the seed set, and the existence of the same in the resultant crop; in fact, some of the best results were obtained from sets with outgrowths. An inverse ratio between the size of the seed piece and the percentage of heavy tubers in the resultant crop was found; this, and the productivity of secondary growths, may be correlated with immaturity of the seed tubers.—*G. R. Bisby.*

3254. SANDSTEN, E. P., and C. M. TOMPKINS. Degeneration in Colorado potatoes. Colorado Agric. Exp. Sta. Bull. 278. 15 p., illus. 1922.—Plots of Russet Burbank and Brown Beauty varieties of potatoes were planted using best hand selected seed, best culls, and poorest culls, which gave, respectively the best average, the next best, and the worst yields. The authors state that degeneration in Colorado potatoes is caused primarily by lack of proper seed selection, and that "degeneration is not of a permanent nature." It is considered that deformed tubers derived from good stock will produce normal tubers under favorable conditions.—G. R. Bisby.

3255. SAUNDERS, E. R. Address to the Botanical Section. Rept. British Assoc. Adv. Sci. 1920: 169-190. 1920.—This address briefly reviews progress of genetics since Mendel, calling particular attention to: (a) Effects of numerous factors on same character. Under this head the writer cites her own work with stocks to show that hairiness depends on the simultaneous presence of at least 4 dominant factors, in the absence of any 1 of which the plant is glabrous. The obverse of this picture is presented by Nilsson-Ehle's discovery that the ligule in the oat is dependent on the presence of any 1 of 5 factors, the ligule being absent only when all 5 are recessive. (b) Effect of 1 factor on widely different characters of the organism. In support of this the speaker cites Heribert-Nilsson's willow crosses from which that author concluded that the specific differences depend on a very few factor differences but that each factor influences a number of characters, although perhaps the results might be said only to prove factor differences in a few pairs of chromosomes. In this connection it is also shown that in *Datura* so-called specific differences segregate in the same way in which varietal ones do in the cross between *D. Stramonium* and *D. Tatula*. (c) Linkage phenomena. Under this head are cited the case of linkage between the factor for plastic color in stocks with factors for sap color intensity and that of the linkage of the factors for flower color, standard form, and pollen shape in the sweet pea. Following this, mention is made of the phenomena of crossing over as exhibited in these plants. This leads the author into a discussion of some length as to the explanation of crossing over. She points out that if it could be shown that segregations take place at more than one time in the life history it would be possible to explain crossing over on the reduplication hypothesis, although she says nothing about how this might explain the original linkage. There follows a sympathetic outline of the chromosome theory of crossing over and linkage as presented by Morgan and his colleagues. She points out, however, that there are cases known in which the present theory is apparently inadequate. She cites the case of stock crosses involving the white-cream and single-double factor pairs in which hybrid plants produce no pollen carrying either of the dominant (white and single) factors. She inclines to reject Morgan's suggestion of lethal factors and to regard pre-meiotic segregation as a more probable hypothesis. The paper concludes with some observations on the relative share of nuclei and cytoplasm in the organic response to environmental stimuli during development.—L. L. Burlingame.

3256. SAX, KARL. Sterility in wheat hybrids. II. Chromosome behavior in partially sterile hybrids. Genetics 7: 513-552. 3 pl. 1922.—The chromosome numbers obtained by Sakamura [see Bot. Absts. 3, Entry 285] in root-tips were confirmed in pollen mother cells. In *Triticum monococcum*, 7 bivalents were found at the late prophase and metaphase of the 1st division. The attachment of the fibres was subterminal. In the pollen mother cells of *T. durum* and *T. polonicum* there were 14 bivalents. In *T. Spelta* and *T. vulgare*, 21 bivalents were seen before the 1st division. There was apparently little difference in the sizes of the individual chromosomes. Sakamura's count of *Secale cereale* was confirmed, 7 bivalents being noted. In the cross of *T. monococcum* by *T. turgidum*, at the 1st division, about 7 bivalents and approximately 7 univalents were seen, the latter usually at the poles. The univalents did not divide until the 2nd division; a result differing from that found in the crosses between wheat with 14 pairs and wheat with 21 pairs of chromosomes, in which Kihara's findings [see Bot. Absts. 2, Entry 946; 4, Entry 627] were confirmed, namely that the 7 univalents divide at the equator after the 14 bivalents have divided, and do not divide again. In the F_1 plants from the cross of wheat with 7 pairs and wheat with 14 pairs, only about 2-3 per cent of the pollen grains

appeared normal; while in the crosses of 14-pair by 21-pair wheat, about 80 per cent appeared perfect. The pollen-grains increase in volume in the uncrossed wheats, as the number of chromosomes increases; but usually in less than arithmetical proportion. The pollen size is much more variable in the F_1 of the cross between wheats with 14 and 21 pairs, than in crosses between species with the same number of chromosomes. In the F_1 of crosses, pollen, ovule, and embryo abortions are looked on as mainly due to harmful chromosome combinations. The greater sterility in certain F_2 plants is regarded as caused, in addition, by somatic weakness.—*John Belling.*

3257. SAX, KARL. Sterility in wheat hybrids. III. Endosperm development and F_2 sterility. *Genetics* 7: 553–558. 1922.—*Triticum durum* and *T. vulgare* were crossed both ways. The parent varieties had respectively 2.7 and 2.2 grains per spikelet; while the F_1 plants averaged 0.6 and 0.5 in the 2 crosses. The individual weights of the grains borne on the F_1 plants varied much more than did those of the parent plants. From a single F_1 plant, 78 grains germinated; but 17 of these seedlings failed to flower; and of the 61 plants which flowered, 14 set no grain. Only 1 (or 2) of these F_2 plants had as much fertility as the grandparents. The mean number of grains per spikelet in the 61 plants which flowered was 0.8, with a standard deviation of over 0.6. Among the 47 plants which set seed, there was about zero correlation between the weight of the grain from which a plant grew and the number of grains it produced per spikelet.—*John Belling.*

3258. SCHAFFNIT, E. Neuere Untersuchungen über die Brennfleckenkrankheit der Bohnen. [Recent investigations of the anthracnose of beans.] *Beitr. Pflanzenzücht.* 6: 25–34. 1922.—The author's observations on spore germination, appressoria formation, penetration of host, development of the pathogen within, and the effect upon the host tissues are presented. Cell changes following invasion involve enlargement of nucleus and nucleolus, and conversion of the chlorophyll to "phaophytin." The cytoplasm becomes granular and crumbly, but the starch remains unaltered. Paraphysis-like bodies distinct from spines were observed among the conidiophores. Weather and soil conditions as well as methods of planting favorable for the development and spread of the pathogen are pointed out. The greater prevalence of the disease on bush than on pole beans is due in part to greater humidity of air near the ground. Attempts are being made to breed a resistant erect type with fleshy tender pods containing white seed. Not much difference was observed in the amount of disease on inoculated plants fertilized with unbalanced solutions or when over-nourished or under-nourished with either nitrogen, phosphoric acid, or potassium, although there were considerable morphological and anatomical differences. Over-fertilizing with nitrogen aids the development of the fibrovascular bundles while under-feeding hinders it. The phloem develops strongly with potash over-feeding, weakly with under-feeding. Plants over-fertilized with phosphoric acid were injured by the treatment. There was a greater development of woodiness in the suture tissues of pods in case of plants over-fertilized with either nitrogen or potash as compared with those under-fertilized, while the reverse was true when phosphoric acid was used. It was found that infection and spore formation followed inoculation of susceptible varieties within 8 days while it took 30 days in case of resistant varieties. The starch in the cells of resistant and immune varieties is converted to sugar much more slowly than in susceptible ones. Hydrolysis of protein is accelerated through the action of the enzyme of expressed sap of susceptible beans. There is a correlation between the degree of resistance and the kinetic energy of catalase reaction. The curve of rapidity of action for very susceptible varieties is almost horizontal while for immune varieties it falls off rapidly. The curve for moderately susceptible ones lies between the 2.—*M. F. Barrus.*

3259. SCHULTZ, ADOLPH H. Zygodactyly and its inheritance. *Jour. Heredity* 13: 113–117. 4 fig., 3 charts. 1922.—Webbing between fingers and toes is called zygodactyly. It is normally present in early development and may in rare instances persist throughout life as a developmental arrest. In the foot the persistence of the webbing seems to occur always between the 2nd and 3rd toes. Skin-fusion between these toes is found in many marsupials and in the

Siamang apes. When present in man the tendon of the long extensor muscle for toes two and three is unsplit for an unusually long distance. In no zygodactyl family does the anomaly skip a generation. The chance for the female to transmit webbed toes is very much less than for the male, and female progeny in general is less apt to inherit zygodactyly than male progeny.—A. H. Schultz.

3260. SHAMEL, A. D. A bud variation of the Le Grande Manitou Dahlia. Jour. Heredity 10: 367-368. 1 fig. 1919.—The typical flowers of this Dahlia have white petals striped and speckled with violet. On 2 plants of this variety there have been produced self-colored violet flowers, having the number, shape, and size of the petals different from the typical flowers on the same plants.—Edith Lang.

3261. SHERWOOD, R. M. Correlation between external body characters and annual egg production in White Leghorn fowls. Texas Agric. Exp. Sta. Bull. 295. 12 p. 1922.—A study was made on 28 White Leghorn hens near the close of their first laying year. The correlation coefficients obtained follow:

<i>Characters correlated</i>	<i>Correlation</i>
Color of shanks—annual egg-production.....	-0.622 ± 0.037
Color of beak—annual egg-production.....	-0.603 ± 0.038
Pliability of pubic bones—annual egg-production.....	+0.472 ± 0.046
Handling qualities—annual egg-production.....	+0.431 ± 0.048
Number of primary wing feathers molted—annual egg-production.....	-0.522 ± 0.043
Body weight—annual egg-production.....	+0.009 ± 0.060
Width of pelvic arch—body weight.....	+0.216 ± 0.057
Width of pelvic arch—annual egg-production.....	+0.210 ± 0.057
Ratio of width of pelvic arch to weight—annual egg-production..	+0.178 ± 0.058
Capacity—body weight.....	+0.468 ± 0.047
Capacity—annual egg-production.....	+0.093 ± 0.059
Ratio of capacity to weight—annual egg-production.....	+0.100 ± 0.059
Depth of body—body weight.....	+0.645 ± 0.035
Depth of body—annual egg-production.....	+0.174 ± 0.058
Ratio of depth of body to weight—annual egg-production.....	+0.149 ± 0.058
Length of keel—body weight.....	+0.384 ± 0.051
Length of keel—annual egg-production.....	+0.208 ± 0.057
Ratio of length of keel to weight—annual egg-production.....	+0.120 ± 0.059

—F. A. Hays.

3262. SHULL, A. FRANKLIN. Sex determination in rotifers. 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 138-141. Williams & Wilkins Co.: Baltimore, 1923.—The term "sex determination" as applied to factors affecting mode of reproduction in rotifers is justified, since sex in these animals is much more closely related to the life cycle than in aphids and Cladocera. Factors affecting life cycle, and hence sex, of rotifers are heredity, chemical substances, nutrition, and long-continued absence of bisexual reproduction. The effect on the life cycle is produced suddenly in the maturation of egg, but does not affect the chromosome number. The change is probably of a chemical nature, and may be merely 1 stage in a series of gradual changes. A metabolic theory may not be favored by results on rotifers, but is certainly not opposed by them. However, the author does not think of a critical change as occurring at a given "metabolic level," this expression being probably inapplicable to rotifers and perhaps representing unessential features in other animals.—A. Franklin Shull.

3263. SINOTO, YOSITO. On the nuclear divisions and partial sterility in *Oenothera Lamarckiana*, Ser. Bot. Mag. Tokyo 36: 92-98. 1922.—The studies were based on a culture derived from *O. Lamarckiana* now growing wild in Japan. Counts of more than 1,000 pollen mother-cells showed about 50 per cent with pairing of chromosomes or with regular nuclear plates.

This percentage is believed to correspond to the 50 per cent of perfect pollen grains. The following irregularities were noted in the distribution of chromosomes; 8+6 and 9+5 noted in both heterotypic and homotypic mitoses; division or fragmentation of the chromosomes on spindles suggesting degeneration; chromosomes in both divisions left outside of the anaphasic group either to degenerate or to form small extra nuclei; non-disjunction; more than 14 chromosomes occasionally formed in the heterotypic mitosis. He reports for somatic mitoses the segmentation of the spirem first into 7 sections and then the transverse division of each section to give the diploid number of 14 chromosomes which are thus held to be paired end to end. Seed germination occurred in about 35 per cent of the seed-like structures. Among the seedlings *albida*- and *oblonga*-like forms appeared and *nanella* was in high percentage.—*B. M. Davis.*

3264. SIRKS, M. J. [Dutch rev. of: LEHMANN, E. *Die Theorien der Oenotheraforschung. Grundlagen zur experimentellen Vererbungs- und Entwicklungslehre.* (Theory in Oenothera studies. Foundation for the experimental study of heredity and development.) 526 p. 207 fig. Gustav Fischer: Jena, 1922.] *Genetica* 4: 470-474. 1922.

3265. SIRKS, M. J. [Dutch rev. of: STOMPS, T. J. *De stoffelijke basis der erfelijkheid bij planten en dieren.* (The material basis of heredity in plants and animals.) 270 p., 24 fig. Erven F. Bohn: Haarlem, 1922 (see Bot. Absts. 12, Entry 420).] *Genetica* 4: 543-544. 1922.

3266. SIRKS, M. J. [Dutch rev. of: TSCHULOK, E. *Deszendenzlehre (Entwicklungslehre). Ein Lehrbuch auf historisch-kritischer Grundlage.* (The doctrine of descent (evolution). A text book on the historical critical basis.) 324 p. G. Fischer: Jena, 1922.] *Genetica* 4: 556. 1922.

3267. SPÄRCK, R. *The conditions of sex-change in the oyster (Ostrea edulis).* *Nature* 110: 480. 1922.—In the Limfjord, on account of lower temperature, attainment of sexual maturity is delayed and duration of male stage is prolonged beyond that found by Orton (see Bot. Absts. 12, Entry 1810). Duration of female stage is shortened and observations on marked specimens show that change from female to male condition may take place in less than a week. Decrease in number of oysters in northern stations is accounted for by effect of lower temperature on breeding.—*R. E. Clausen.*

3268. SPERLICH, A. [German rev. of: SPERLICH, ADOLPH. *Über phyletische Potenz.* (On phyletic potency.) *Sitzungsber. Akad. Wiss. Wien [Math. Nat. Kl.]* 128: 379-475. 4 pl., 4 fig. 1919.] *Zeitschr. Indukt. Abstamm.- u. Vererb.* 29: 93-96. 1922.

3269. TERRY, R. J., and LEE D. CADY. *Comparison of the incidence of the supracondyloid process in groups with normal and abnormal mentality.* 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 174-177. Williams & Wilkins Co.: Baltimore, 1923.—There are in the literature reports indicating a very much greater frequency of the variation known as the supracondyloid process of the humerus among insane people than in those of normal mentality. Results of recent studies in living subjects do not bear out this conclusion. The incidence of persons presenting a supracondyloid process of 3 mm. or more in height in 515 adult whites, apparently mentally normal, was 1.16 per cent; in 1,000 insane whites, 1.2 per cent for process 3 mm. or more in height. It is to be noted that the insane patients were taken at random and included a large number with no family history of insanity.—*R. J. Terry.*

3270. THAYER, PAUL. *A variation in the Downing gooseberry.* *Jour. Heredity* 13: 284. 1922.—Gooseberry plants were found in a Downing plantation in Ohio which differed from Downing in that the leaves were long and narrow instead of nearly as broad as long and the bushes completely or nearly barren. It is suggested that this variation may be due to an obscure disease or possibly is a spurious strain or variety like the off-type lemon trees found by Shamel.—*Richard Wellington.*

3271. TOWER, WILLIAM LAWRENCE. Darwinism. An analysis by observation and experiment. A digest and preliminary statement of results. *Genetica* 4: 417-442. 1922.—An account is given of several observations and experiments designed to determine whether those individuals which survive and reach maturity do so because they are superior to their fellows, as postulated by the hypothesis of natural selection, or because they chanced to fall under more favorable conditions of life. Studies of mimicry in Lepidoptera based upon 220 censuses of 10 plots in the valley of the Rio Motzorongo in Mexico in which 2,219,754 pairs of wings were obtained in an 8-year period showed that only 0.50 per cent of elimination was due to vertebrate predacious enemies which were assumed to act selectively, and that the percentage of elimination in model and mimic was the same. In the same collection of wings comparisons of eliminated members of species, supposedly protectively colored, with the non-eliminated individuals disclosed no difference between the 2 groups. Observations of habits of protectively colored species also failed to demonstrate that they make use of their protective resemblance as a means of concealment. Stocks of *Leptinotarsa panamensis*, a species the eggs of which have a very thin shell highly susceptible to desiccation, were taken from their normal habitat and transported to 13 stations selected for variation in moisture conditions. The beetles became established in moist stations, but failed in the drier ones because the eggs dried up; there was no evidence of differential survival. Seeds of *Solanum rostratum*, *S. Hertwiggii*, and *S. lanceolatum* were sown on plots in the natural condition and on others prepared by removal of vegetation. Under natural conditions 10,335 seed out of 260,000 germinated; on prepared plots 228,742 out of 260,000 germinated. Populations of 4 species of beetles, *Leptinotarsa signaticollis*, *L. undecimlineata*, *L. diversa*, and *L. decemlineata*, were counted and separated in each case into 2 lots,—one returned to a plot in the natural condition for aestivation, the other to a finely spaded and prepared plot. Under favorable conditions 67,977 out of 86,070 survived; under natural conditions only 5,709 out of 86,070 survived. The author concludes that all these observations and experiments show that elimination under normal conditions is a function of chance position relative to eliminating forces and that there is no evidence of survival based upon adaptive characteristics.—*R. E. Clausen*.

3272. TRABUT, LOUIS. Sur les origines du figuier. [On the origin of the fig.] *Rev. Bot. Appl.* 2: 393-396. 1922.—There has been an uncertainty in regard to the native habitat of *Ficus Carica*, the generally admitted mother species of the cultivated fig. The author believes this species has been derived by the intercrossing of a rather large number of species. This hypothesis is based upon the fact that the flowers are fertilized indiscriminately by the insect *Blastophaga* and that innumerable cultivated varieties exist.—*Richard Wellington*.

3273. TRESIDDER, DONALD B. Oestrus and fecundity in the guinea-pig. *Amer. Nat.* 56: 347-359. 1922.—A dioestrus cycle every 16 days, with variations, continues throughout the year in non-pregnant female guinea-pigs. Copulation prolongs dioestrus in multiples of 15 days; underfeeding also prolongs it especially when it occurs late in the cycle. Sexual activity lasts 24 hours; the females usually mate most freely during the early part of the period, although the behavior varies. Macroscopical signs of heat are unreliable. Fall matings are most favorable, for which the males are partially responsible. Young females constantly with males were found to mate earlier than those isolated. Successful mating may occur 1-6 hours after parturition. The writer found the average number of foetuses per pregnancy to be 3. There is a close agreement between the number of corpora lutea in an ovary and the number of implantations in the corresponding horn of the uterus, although migration of ova and the absorption of embryos are not uncommon. The writer has found that palpating guinea-pigs reveals with certainty, (1) the number of embryos after the 15th day, and (2) the presence of large cystic ovaries.—*H. W. Feldman*.

3274. TURESSON, GÖTE. The genotypical response of the plant species to the habitat. *Hereditas* 3: 15-350. 79 fig. 1922.—Shade and sun forms, succulent and thin-leaved forms, inland and coastal forms, dwarf salt-marsh and taller lowland forms were grown in cultures under like conditions. If under like conditions they were identical, the differences found under various conditions were attributable to habitat. If, however, they still showed mor-

phological or habit differences, the different forms were crossed and the F_1 and F_2 generations studied. In this way it was possible to distinguish between mere habitat types and hereditary types. Records were made of character of leaf, of leaf margin, of inflorescence, of angle of stem, etc. In this study an attempt was made to ascertain whether the existence in nature of such forms is the result of an advantageous response on the part of the individual or whether these forms are brought into existence through a genotypical response of the species-population to definite habitat conditions." Shade and pasture forms of *Lysimachia vulgaris* were found to be only habitat forms, while the shade forms and pasture forms of *L. nummularia* remained distinct when grown in a similar environment. *Dactylis glomerata* var. *lobata*, the shade form, although resembling the sun form when grown together under identical conditions did not lose its distinctive character and is therefore regarded as an hereditary shade form and one not due entirely to environment.—A comparison was made of the salt marsh dwarf forms transferred and compared with the taller lowland form. *Aster tripolium* var. *diffusus* and the ordinary *A. tripolium* showed what seemed to be hereditary differences, although habitat modification was also shown. *Succisa pratensis* var. *nana* from the natural salt marshes seemed to be made up both of the hereditary dwarf form and of habitat dwarfs. *Centaurea jacea* var. *humilis* from salt meadows was made up of a heterogeneous assemblage of diverse, genetically different types. Habitat conditions in the salt meadows produce a dwarf growth and make the whole population appear homogeneous. A comparison was made of succulent and thin-leaved types. *Solanum dulcaria* showed hereditary differences of 3 distinct types. Various types of *Matricaria inodora*, *Leontodon autumnalis*, and *Melandrium rubrum* indicated heritable differences. The salt plants along the coast cannot be considered entirely facultative halophytes, but should be considered obligate halophytes. *Atriplex litorale*, *A. patulura*, *A. sarcophyllum*, *Armeria vulgaris*, and *Hieracium umbellatum* showed both modificatory and hereditary biotypes. There was ample evidence of hereditary differences in the different sets of individuals. In some cases the habitat types were more homogeneous in the field than in cultures. Cultures showed the degree of masking due to habitat. The habitat type, although it may appear as homogeneous, may be represented by many distinct genotypes. This supports the theory of Nägeli rather than Lamarck. The genotypic constitution of the plant is regarded as of primary importance. Where the habitat alternates sharply the type also alternates sharply. The morphological parallelism between the modification and the hereditary variation offers proof of control of environmental factors. Where a habitat, demanding dwarf forms, is inhabited largely by hereditary non-dwarf forms, no doubt would seem to remain as to the influence of habitat factors upon the genotypical composition of the species population in certain habitats. But in the majority of cases investigated not the habitat modifications but the corresponding hereditary type was found to populate the area. If organisms are able to respond rapidly to special demands the type showing habitat modification would be expected, but if only a limited degree of modification is possible hereditary habitat types would dominate. The factor which demands extreme modification in the habitat form may easily become a limiting factor for such forms, but would not operate as a limiting factor on the hereditary forms. If the term species is limited to the isolated units of hereditary forms the species lose one of the most characteristic qualities,—the ability to respond genotypically to a wide range of habitat. The Linnean species represents an ecological unit of great importance. In order to distinguish between ecological and purely genetical units the term "ecospecies" has been proposed to cover the Linnean species or genotype compounds as they are realized in nature. The total sum of possible combinations in a genotype compound may be termed a "coenospecies." When this is narrowed down by the ecological combination limits, it may be called an "ecospecies." The ecospecies are made up of habitat types, or what might be called varieties. These ecological subtypes may be termed ecotypes. It indicates the product arising as a result of the genotypical response of an ecospecies to a particular habitat. An ecospecies may populate many different habitats and produce many different ecotypes. The ecotype may in turn be made of "ecophenes" which represent each of the reaction types of the ecotype arising through the modifying influences of the combinations of extreme habitat factors given in nature. The genetical analogies of a cenospecies is a "genospecies," of an ecotype is a genotype and phenotype, and of an ecophene is a "genophene."—H. L. Shantz.

3275. UTTIEN, H. [Dutch rev. of: NILSSON-EHLE, H. *Fortgesetzte Untersuchungen über Fatuoidmutationen beim Hafer*. (Continued investigations on the fatuoid mutations in oats.) *Hereditas* 2: 401-409. 1921.] *Genetica* 4: 475-476. 1922.

3276. UTTIEN, H. [Dutch rev. of: OSTENFELD, C. H. *Some experiments on the origin of new forms in the genus Hieracium, subgenus Archieracium*. *Jour. Genetics* 11: 117-122. 1921 (see *Bot. Absts.* 11, Entry 290).] *Genetica* 4: 477. 1922.

3277. VICARI, E. M. **Hybridization and behavior**. 2nd Internat. Congress Eugenics Vol. II. *Eugenics in race and state*. 75-77. Williams & Wilkins Co.: Baltimore, 1923.—This investigation deals with the inheritance of behavior traits from the genetic standpoint. Two homozygous races of mice were crossed: Japanese waltzing (inbred for 50 generations) and albino (inbred for 25 generations). The waltzers are very active due to their continual whirling habit; the albinos do not whirl and are more or less sluggish. The results are based on 45 Japs, 75 albinos, and 110 F₁ hybrids. In learning a simple maze problem the 2 parent races are somewhat similar with respect to (1) the number of perfect trials, (2) the number of consecutive perfect trials, (3) the average time per trial. Using the same apparatus and criterion of measurement the hybrids are neither like either parent nor intermediate between them; they are superior. This is shown in (1) the number of consecutive perfect trials, (2) the total number of perfect trials, (3) the length of time in going through the maze. The facts show that the phenomenon of heterosis may also be found in behavior traits.—*E. M. Vicari*.

3278. VUILLEMIN, PAUL. **Disjonction et combinaison des caractères des parents dans un hybrid**. [Segregation and combination of parent characters in a hybrid.] *Compt. Rend. Acad. Sci. Paris* 175: 353-355. 1922.—Hybrids from a cross between a 5-spurred and a spurless *Aquilegia* show the dominance of the spur character. The influence of the recessive character was measured by the decrease in the number of spurs on the flowers of each succeeding generation. Two factors modify the type of flowers: (1) segregation of characters transmitted by the parents; (2) increasing the combination of characters. The combination of dominant and recessive characters is emphasized by the increasing preponderance of flowers with 3 spurs.—*H. C. McPhee*.

3279. WAGENSEIL, F. [German rev. of: KLATT, B. **Mendelismus, Domestikation und Kraniologie**. *Mendelism, domestication, and cranology*. *Arch. Anthropol.* 18: 225-250. 4 fig. 1920.] *Zeitschr. Indukt. Abstamm.- u. Vererb.* 29: 213. 1922.

3280. WALTER, H. E. **Genetics: an introduction to the study of heredity**. *Rev. ed.*, xvi + 354 p., 92 fig., 6 diagr. Macmillan Co.: New York and London, 1922.—His text book is designed to present the salient points of genetics in an elementary manner. The general plan in the revised edition remains the same as in the 1st edition, but the subject matter has been worked over to bring in recent advances in genetics. The revised edition is divided into 15 chapters, instead of 12; the subject matter has been enlarged from 262 to 336 pages; and the number of figures increased from 72 to 92. The revised edition opens with a general orientation which is followed by a discussion of variation. A treatment of the origin of heritable differences then leads to a prolonged discussion of the inheritance of acquired characters. The author concludes this discussion with the same statement as in his previous edition, that the weight of evidence is against belief in the inheritance of acquired characters. Mendelism is next considered; independent unit characters, segregation, and dominance are characterized as the trinity of Mendelian principles. In the chapter on pure lines and selection the results of numerous selection experiments are described and in the next chapter on the factor hypothesis the conclusion is reached that selection is effective (1) by isolation of pure lines; (2) by elimination or addition of modifying genes; and (3) by mutation of genes. Blending inheritance is developed as an expression of the action of multiple factors. The following chapter discusses atavism and reversion, and methods of animal and plant breeding. The chapter on the carriers of the heritage is shifted from 2nd to 10th place in the revised edition. It is followed

by a chapter on the architecture of the germplasm which is new and which gives a brief account of the *Drosophila* investigations. At this point another new chapter on somatogenesis, "the hereditary tunnel," is inserted in which the main features of development are set forth. The chapter on sex determination has been rewritten and enlarged. The book closes with chapters on the application to man and human conservation. A list of books and recent general works is included.—*R. E. Clausen.*

3281. WEATHERWAX, PAUL. A rare carbohydrate in waxy maize. *Genetics* 7: 568-572. 1922.—The endosperm of the Chinese waxy type of maize has been shown to consist entirely of a hitherto rare and ephemeral carbohydrate, erythrodextrin, a dextrin which stains red with iodine. The value of this discovery in the genetic analysis of this character is pointed out and the further suggestion is advanced that a consideration of the fundamental physical and chemical nature of the endosperm of sweet corn would harmonize the somewhat divergent views of maize inheritance now in existence. The Asiatic distribution of the cereals having the carbohydrate erythrodextrin is noted, but no significance is attached to this fact.—*J. H. Kempton.*

3282. WHITING, P. W. Heredity in the honey bee. *Jour. Heredity* 13: 2-8. 3 pl. 1922.—Inheritance in the honey bee is recognized as of crisscross type due to the fact that drones arise from unfertilized eggs and thus inherit maternal characters only. The 3 castes, workers, queens, and drones, are strikingly different from each other. Queens and drones show degeneration of worker instincts, due to "parasitic life on worker colony." Great specialization of the 3 casts is noted, and the problems of heredity involved in the inheritance of these differences are discussed from the point of view of genetics, phylogeny, and physiology. Determination of sex is not due to the source of the germinal material, but to its quantity,—a simplex genetic assortment producing a male, a duplex assortment a female, either a queen or worker, depending on the feeding. The high specialization of the honey bee colony has made for greater efficiency.—*R. C. Cook.*

3283. WHITING, P. W. The analysis of genetic differences through haploid parthenogenesis. 2nd Internat. Congress Eugenics Vol. I. Eugenics, genetics and the family. 102-105. Williams & Wilkins Co.: Baltimore, 1923.—The parasitic wasp, *Hadrobracon*, reproduces males by haploid parthenogenesis, produces females sexually; also virgin females produce only males. These latter occur in a 1:1 ratio from a heterozygous mother. A variation affecting venation has its genetic basis in a single Mendelian difference, but its appearance depends upon temperature, food, and chance conditions of growth. One stock, unaffected by 8 generations of selection, shows the variation in 93 per cent of individuals. Another shows it in practically none, while there are indications that it is possible to isolate another stock with less than 1 per cent showing variation. A system of inbreeding and crossing to type stock, tests genetic constitution of each male whatever his apparent character. This system should eliminate all differences from type except the one under consideration. A sexual generation, resulting from a cross to type stock, is alternated with a parthenogenetic generation showing segregation. From the results of this type of analysis the theory is advanced, although not as yet entirely demonstrated, that whether a genetic character difference from type appears in all of the individuals possessing the genetic potentiality of showing it or in a very high ratio of the individuals or even in less than 1 per cent, the factorial basis may be a single Mendelian unit.—*P. W. Whiting.*

3284. WIELENSIEK, S. J. [Dutch rev. of: SALAMAN, R. N., and J. W. LESLEY. Some information on the heredity of immunity from wart disease. Rept. Internat. Potato Conference 1921: 105-111. 1922 (see Bot. Absts. 11, Entry 2899).] *Genetica* 4: 541-542. 1922.

3285. WRIGHT, SEWALL. Another pedigree of webbed toes. *Jour. Heredity* 13: 118. 1922.—A pedigree submitted by Dr. Ira S. Wile is presented in which the mode of inheritance is evidently as a dominant unit, with no relation to sex. Other pedigrees have been presented

in the Journal of Heredity in which inheritance of the character corresponds exactly with the transmission of the Y-chromosome. It is not especially surprising that the webbing is inherited differently in different families. Night-blindness, for instance, is a sex-linked factor in some families, and a simple dominant in others.—*R. C. Cook.*

3286. WRIGHT, SEWALL. The effects of inbreeding and crossbreeding on guinea pigs. III. Crosses between highly inbred families. U. S. Dept. Agric. Bull. 1121. 61 p., 27 fig. 1922.—Experiments for 15 years on the effects of inbreeding on guinea pigs include: the records of 23 inbred families, each descended from an original pair (over 25,000 animals); a control stock in which inbreeding was avoided (over 4,000 animals); and crosses among the inbred families (nearly 5,000 animals). Inbreeding has been carried on for over 20 generations, without obvious degeneration. On the average a decline in all the elements of vigor has occurred. A conspicuous differentiation among families has been brought to light and increased by inbreeding. Crosses between the inbred families involve: (1) first crosses between different families; (2) progeny of a first cross mated with others of a different cross; (3) brother-sister matings of crossbreds; (4) brother-sister matings continued to 2nd generation; (5) inbred females mated with unrelated crossbred males; (6) crossbred females mated with unrelated inbred males; (7) heavy animals from crossbreds selected and inbred; (8) animals from large litters mated. Seasonal fluctuations were corrected for, by comparing the average of each experiment, for the entire period in which it was maintained, with the estimated record of the total inbred stock produced simultaneously. "Crosses between different inbred families have resulted in a marked improvement over both parental stocks in every respect, due allowance having been made for the effects of size of litter on the other characters. This improvement appears to its full extent in the progeny of the first cross, in the case of adult weight (about 12 per cent) and resistance to tuberculosis (about 20 per cent). The mortality between birth and weaning is found to depend about three-fourths on the breeding of the young and one-fourth on that of the dam. There is thus a marked improvement in the first cross (about 11 per cent) in spite of the inbred dam, but there is some additional advance in the progeny of a crossbred dam with an unrelated male. In the rate of gain between birth and weaning, the breeding of the dam and of the young are about equally important. An improvement of about 16 per cent was obtained in this respect. Birth weight depends largely on the dam—about three-fourths—and only one-fourth on the breeding of the young. There is thus only a slight improvement before the second generation in which it amounted to some 9 per cent. The mortality at birth is almost wholly a maternal affair. Crossbreeding of the dam adds about 7 per cent to the chances of the young. The heredity of the young also counts for nothing in frequency or size of litter. The sire is somewhat more responsible than the dam in the former case; the dam seems to be wholly responsible in the latter. Frequency of litter was increased over 30 per cent and size of litter over 10 per cent when both sire and dam were crossbred." "Analysis of the various crosses, indicates that the results are all the direct or indirect consequence of the Mendelian mechanism of heredity. The fundamental effect of inbreeding is the automatic increase in homozygosis in all respects. An average decline in vigor is the consequence of the observed fact that recessive factors, more extensively brought into expression by an increase in homozygosis, are more likely to be deleterious than are their dominant allelomorphs. The differentiation among the families is due to the chance fixation of different combinations of the factors present in the original heterozygous stock. Crossing results in improvement because each family in general supplies some dominant factors lacking in the others. Dominance or even imperfect dominance in each unit character is built up into a pronounced improvement over both parent stocks in the complex characters actually observed. A certain portion of the increase in vigor of the first cross between inbred families is maintained on resuming random mating." The writer points to important application of inbreeding, followed by cross-breeding and resumed inbreeding, in the improvement of livestock. Progress by ordinary selection of individuals is very slow, because environment is relatively more important in determining the individuality of the animal, in economic characters, such as growth, fertility, and disease resistance.—*H. W. Feldman.*

3287. WRIGHT, SEWALL. **The effects of inbreeding on guinea-pigs.** 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 266-269. Williams & Wilkins Co.: Baltimore, 1923.—In experiments involving over 35,000 guinea-pigs it has been found that inbreeding has resulted in a decline in the average vigor in every respect studied, including frequency and size of litters, growth from birth to maturity, mortality at birth and later, and resistance to tuberculosis. Certain families, however, have remained vigorous after more than 20 generations of brother-sister mating. There has been a marked genetic differentiation. In general, a particular combination of vigor in some respects, with weakness in others, has become characteristic of each of 23 families. There is no correlation between the standing of a family in one respect and in others. On crossing 2 families, there is marked improvement in every respect either in the 1st or 2nd generation, depending on how far the character pertains to the young and how far to the dam or sire. The results are shown to be in accord with the Mendelian theory of inbreeding.—*Sewall Wright*.

3288. WOLLENWEBER, H. W. **Die verschiedenen Methoden der Kartoffelzüchtung unter Berücksichtigung der Krankheitsforschung.** [The different methods of potato breeding in connection with disease investigations.] Beitr. Pflanzenzücht. 6: 35-44. 1922.—Potato culture may be divided into 5 periods: (1) introduction during the 16th century; (2) dissemination and development as a field crop up to and including the 17th century; (3) describing varieties and selecting against disease, 1776-1819; (4) introducing better varieties, investigating diseases and beginning of crossing, first half of 19th century; (5) developing, distributing, breeding, and selecting disease resistant strains, second half of 19th century. Methods being used for potato improvement are selection, cross breeding, and introduction from other countries. Qualities sought are freedom from disease, adaptability to soil and climate, yield, starch content, keeping quality in storage, and special time of ripening. Qualities of the tubers depend upon size, shape, color of flesh, number and prominence of eyes. Very little has been written regarding methods of cross pollinating. The author briefly describes his method and mentions the difficulties connected with it. Besides the technique of cross breeding, the worker must be intimately acquainted with the diseases. A large number of interesting problems are suggested for the breeder of disease-resistant varieties of potatoes.—*Charles Chupp*.

3289. YULE, GEORGE U. **An introduction to the theory of statistics.** 6 ed., xv + 415 p. C. Griffin & Co., Ltd.: London, 1922.

3290. ZELNY, CHARLES. **Reverse mutation.** 2nd Internat. Congress Eugenics. Vol. I. Eugenics, genetics and the family. 113-114. Williams & Wilkins Co.: Baltimore, 1923.—Reverse mutations in bar series of multiple allelomorphs of *Drosophila* are more frequent than original ones. This frequency is not due to recent origin. The large shift from ultra-bar to full is as frequent as smaller shifts from bar to full and ultra-bar to bar. Direction of selection is not a factor. Mutations occur in germ plasms of both males and females and are not confined to a single period. The different components of the bar series are definite entities. They do not grade into one another and their origin is not a factor in their behavior.—*Charles Zeleny*.

3291. ZIEGLER, H. E. [German rev. of: GOLDSCHMIDT, RICHARD. **Die quantitative Grundlage von Vererbung und Artbildung.** (The quantitative basis of heredity and species formation.) 163 p., 28 fig. Julius Springer: Berlin, 1920.] Arch. Rass.- u. Ges.-Biol. 14: 343-345. 1922.

3292. ZIEGLER, H. E. [German rev. of: GOLDSCHMIDT, RICHARD. **Einführung in die Vererbungswissenschaft. In zwanzig Vorlesungen.** (Introduction to genetics. In 20 lectures.) 3rd ed., 519 p., 178 fig. Engelmann: Leipzig, 1920.] Arch. Rass.- u. Ges.-Biol. 14: 338-339. 1922.

3293. ZIEGLER, H. E. [German rev. of: GOLDSCHMIDT, RICHARD. *Mechanismus und Physiologie der Geschlechtsbestimmung*. (Mechanism and physiology of sex-determination.) 251 p., 113 fig. Gebrüder Borntraeger: Berlin, 1920 (see also Bot. Absts. 9, Entry 1388). Arch. Rass.- u. Ges.-Biol. 14: 340-343. 1922.

HORTICULTURE

J. H. GOURLEY, *Editor*

(See also in this issue Entries 2942, 3103, 3118, 3136, 3143, 3177, 3178, 3237, 3245, 3247, 3270, 3272, 3361, 3368, 3448, 3505, 3511, 3518, 3599, 3645)

FRUITS AND GENERAL HORTICULTURE

3294. ANONYMOUS. Export of apples. New Zealand Jour. Agric. 24: 82-85. 1922.—This article reports experiments with Cox's Orange Pippin, Dunn, and Jonathan to determine the best stage of maturity for shipment.—N. J. Giddings.

3295. ANONYMOUS. Origin of the Rome Beauty apple. Jour. Dept. Agric. Victoria 19: 483. 1921.

3296. ANONYMOUS. Planting and reconstitution of vineyards. Conditions governing the distribution of *Phyloxera*—resistant vine rootlings and cuttings. Jour. Dept. Agric. Victoria 19: 318-319. 1921.

3297. ARISZ, W. H. Over den invloed van zwaar tappen op de chemische samenstelling van de latex. [The influence of severe tapping on the chemical constitution of latex.] Arch. Rubbercult. Nederland.-Indië 4: 27-29. 1920.—Trees of *Hevea brasiliensis* were severely tapped with the following results: (1) The ratio of resinous substances to rubber remained unchanged; (2) For the 1st fortnight the concentration of organic substances in the serum was unchanged, then the amount of organic substances decreased; (3) At first, the content of nitrogenous substances was unchanged, later it decreased by as much as 50 per cent; (4) The concentration of inorganic substances in the serum remained practically constant.—C. D. LaRue.

3298. BARSS, A. F. Biochemical problems in agriculture with special references to fruit. Sci. Agric. 3: 100-104. 1922.—A plea is made for more exact and searching methods of research in fruits to include physiological and genetical studies as opposed to the ordinary field experiments. A few of the more important problems requiring study are outlined.—T. G. Major.

3299. BARTLETT, R. G. Picking, grading, and packing bananas. Agric. Gaz. New South Wales 33: 897-899. 1922.

3300. BEVAN, W. Olive trees in the forests. Cyprus Agric. Jour. 17: 64. 1922.—From the Aetomouti and Carpass forests of Cyprus during the past 21 years 780,861 wild olive trees have been transplanted into olive orchards and budded with scions of desirable cultivated varieties.—Wm. Stuart.

3301. BOBILIOFF, W. De reactie van *Hevea* latex. [The reaction of *Hevea* latex.] Arch. Rubbercult. Nederland.-Indië 3: 408-410. 1919.—Latex from many trees of various ages was examined. The latex of *Hevea* generally gives an alkaline reaction. Very few trees have neutral latex.—Carl D. LaRue.

3302. BOBILIOFF, W. Over de correlatie tusschen de productie en het aantal rijen der melksapvaten in den bast van *Hevea brasiliensis*. [The correlation between production and the number of rows of latex-vessels in the bark of *Hevea brasiliensis*.] Arch. Rubbercult.

Nederland-Indië 4: 383-390. 1920.—The coefficient of correlation between yield of rubber and the number of rows of latex vessels in the bark is found by the author to be 0.55 ± 0.051 . Data from 491 trees were used in the computation.—*C. D. LaRue*.

3303. BOBILIOFF, W. Over den oorsprong van het melksap van *Hevea brasiliensis* op grond van proeven met geringde boomen. [The origin of the latex of *Hevea brasiliensis* as indicated by experiments with ringed trees.] Arch. Rubbercult. Nederland-Indië 4: 221-234. 1920.—When trees are girdled just above the ground a small decrease in yield is noted for a time, but later an increase is observed. This indicates that the main portion of the latex is derived from the trunk, not from the roots. The increase observed is probably due to cutting off the flow of food to the roots. Trees girdled above the tapping area show a decrease in yield. Trees girdled both at the root crown and above the tapping area show a much greater decrease in yield than when girdled above only. Pollarded trees show a still greater diminution in yield. The fact that a tree may continue to give a high yield of latex when all communication between the latex vessels of the trunk and those of the roots are interrupted is taken as an indication that in banded trees the stock will not influence the scion so far as yield is concerned.—*C. D. LaRue*.

3304. BUCK, F. E. Plant breeding problems as related to horticulture. Sci. Agric. 3: 86-92. 1922.—This is a discussion of the breeding work being carried out in British Columbia on strawberries, raspberries, pears, tomatoes, peas, kale, broccoli, globe artichoke, flowers, and lawn grasses. The strictly "research" phase of horticultural experimentation is also treated in a general way.—*T. G. Major*.

3305. CAMPBELL, J. A. Lemon culture. New Zealand Jour. Agric. 24: 205-210. 1 fig. 1922.—The importance of careful handling and marketing are discussed. Suggestions from a large California grower are given under the following headings: Varieties, blossoming period, picking, washing, storing, coloring, temperature and storage houses, resorting, grading, and packing.—*N. J. Giddings*.

3306. CASTELLA, F. DE. Resistant stocks. Jour. Dept. Agric. Victoria 19: 278-289, 490-499. 1921.—The present situation with regard to stocks resistant to the attacks of phyloxera is discussed. Resistance in American grapes is defined and explained. The resistant characteristics, soil preferences, climatic adaptation, and union affinities are discussed for all known species and hybrids of resistant stocks. Of the 18 species of American grapes 4 are predominantly important: *Vitis riparia*, *V. rupestris*, *V. berlandieri* and *V. cordifolia*. *Vitis californica* is the only American species which is not resistant. Few pure forms of American species are used. No one stock is ideal on account of varying adaptability. The author selects 5 fundamental stocks for Victorian (Australia) conditions, viz.: *Rupestris du Lot*, *Riparia* \times *Rupestris* 3309, *Riparia* \times *Rupestris* 3306, *Vinifera* \times *Rupestris* A. R. G. 1, *Vinifera* \times *Rupestris* 1202.—Irrigation is said to reduce the activity of phyloxera, but will not kill the insect unless submergence continues for 40 days.—*Wm. E. Lawrence*.

3307. HEDRICK, U. P. The pears of New York. Rept. New York Agric. Exp. Sta. 1921²: xi + 636. Frontispiece, 80 pl. (colored). 1921.—The aim of this volume as stated by the author is: "To give an account of the history and uses of the pear; to depict the botanical characters of cultivated pears; to describe pear growing in the country and more particularly in New York; and, lastly, to give in full detail the synonymy, bibliography, economic status and full descriptions of the most important cultivated pears with brief notices of varieties of minor importance . . . Biographical sketches of men who have been most prominent in pear growing in the United States are to be found in the footnotes."—The 3 species of pears of chief horticultural interest are *Pyrus communis* Linn., *P. nivalis* Jacq., and *P. serotina* Rehd. In America the pear is not grown so extensively as the apple and peach, scarcely more than the cherry and plum. Conditions of climate, pests, season of ripening, taste, and trade, account for its status of culture.—Details of gross structure of the pear of value to the systematist,

and notes as to disease resistance and susceptibility, adaptation to certain climatic and soil conditions, self-fertility or sterility, season of blooming and ripening, and adaptation to dwarf and standard stocks are given. Detailed descriptions and discussions of 91 varieties are given, and several hundred are briefly mentioned as minor varieties.—*J. H. Gourley*.

3308. JONG, A. W. K. DE. Tapproeven bij *Hevea brasiliensis*. [Tapping experiments on *Hevea brasiliensis*.] Arch. Rubbercult. Nederland.-Indië 4: 32-36. 1920.—A series of tapping experiments carried on for 6½ years is described. Different tapping systems (9) were used, and the conclusion was drawn that 2 left cuts on 1 quarter seemed the best system for conditions at Buitenzorg, Java, where the experiments were made.—*C. D. LaRue*.

3309. KERLE, W. D. The production of peanuts. A neglected industry. Agric. Gaz. New South Wales 33: 855-858. 1922.

3310. LARUE, CARL D. Bark thickness in *Hevea brasiliensis*. Arch. Rubbercult. Nederland.-Indië 4: 45-63. 1920.—The thickness of bark of *Hevea* trees decreases rapidly between points 1 and 3 feet from the ground. From the 3 foot to the 5 foot level, the increase is much slower, individual trees varying greatly. Measurements of 161 trees gave a mean thickness of 1.53 mm. left uncut in tapping. When tapping on a cut is stopped, the bark renews with great rapidity, being ⅓ the thickness of the original bark within 9-12 months. There is a correlation of 0.26 ± 0.019 .—*C. D. LaRue*.

3311. MAGNESS, J. R. The handling, shipping, and cold storage of Bartlett pears in the Pacific coast states. U. S. Dept. Agric. Bull. 1072. 16 p. 1922.—As a result of chemical and physiological studies of the past 2 years, it has been found that for fresh fruit shipment, delay of initial picking until 2 weeks after the lenticels become corked over yields a superior eating product. Pears should show a yellow ground color beneath the green before being picked for canning or storage purposes. If held at 30°F., fruit can be kept for several months. Conditions under which fruit is grown parallel its qualities; in general the districts with fairly high temperature and low humidity during the growing season produce pears with best carrying and keeping qualities.—*A. Dorothy Bergnet*.

3312. POPENOE, WILSON. The Capulin cherry. Jour. Heredity 13: 51-62. 7 fig. 1922.—The improvement of the wild black cherry, *Prunus serotina*, indigenous from Nova Scotia to Peru, has been neglected in North America, but in tropical America some excellent horticultural varieties have been developed. The best of these, Capulins, are found in the tablelands of Ecuador and Peru. Relatively inferior forms are in cultivation as far north as Mexico. Recent experiments in Ecuador indicate that propagation of the superior forms by grafting is quite feasible, and there appears to be no reason why they should not be adapted for cultivation in the U. S. A., particularly in regions where the European cherries do not thrive.—*R. C. Cook*.

3313. RAVAZ, I. et G. VERGE. Nouvelles recherches sur les porte-greffes. [New researches on Phylloxera-resistant grape stocks.] Ann. Ecole Nation. Agric. Montpellier 17: 227-241. 1918/1919 [1922].—These investigations confirm the phylloxera-resistant quality of *Riparia*, *Rupestris*, *Riparia* × *Rupestris*, *Riparia* × *Berlandieri*, *Rupestris* × *Berlandieri* and *Vinifera* × *Berlandieri*. Several new hybrids have given promising results.—*F. F. Halma*.

3314. ROBERTSON, W. H. Economic field problems relating to horticulture. Sci. Agric. 3: 155-156. 1922.—A brief discussion is given of soil, variety, insect and disease control, storage, precooling, and shipping problems.—*T. G. Major*.

3315. STOFFERT. Beerenobstau nach neuzeitlichen Grundsätzen. [Berry culture according to modern principles.] Mitteil. Deutsch. Landw. Ges. 37: 685-686. 1922.—A brief review is given of the history of berry culture in Germany, the size of the industry and the requirements for successful culture being emphasized.—*A. J. Pieters*.

3316. VRIES, O. DE. *Latex en rubber van individueele boomen. I.* [Latex and rubber from individual trees. I.] Arch. Rubbercult. Nederland.-Indië 4: 249-267. 1920.—This is a discussion of methods for obtaining data concerning latex and rubber from individual trees. Attention is called to the great variation in the properties of latex and rubber from different trees and to the desirability of the study of such variation.—C. D. LaRue.

3317. VRIES, O. DE. *Latex en rubber van individueele boomen. II.* [Latex and rubber from individual trees. II.] Arch. Rubbercult. Nederland.-Indië 4: 361-379. 1920.—The behavior of the latex from different trees is not always alike. The changes usually observed in the latex when a new tapping cut is opened on a tree are sometimes lacking. Within a year a given tree may show many variations in the properties of latex and rubber.—C. D. LaRue.

3318. WESTER, P. J. *The breadfruit.* Jour. Heredity 13: 129-135. 3 fig. 1922.—The author states that, "considering its potential value as an abundant source of nourishing and palatable food, there is no tropical fruit today so neglected as the breadfruit." An account of its introduction into the West Indies is given, and its uses are described. The yield is said to be 25 tons per hectare per annum. Lists of breadfruit varieties from Fiji, the Carolines, the Society, and the Marquesas Islands are given. The article closes with an appeal for the financing of an expedition to the South Seas to save the superior varieties which are rapidly becoming extinct.—R. C. Cook.

3319. WHITE, C. T. *An Australian citrus relative.* Jour. Heredity 13: 119-121. 1 fig. 1922.—All species of the genus *Microcitrus* are indigenous to Australia. Of these, one of the most interesting and least known is the Russel River Lime (*M. inodora*). Fruit of this and of Meston's Mangosteen (*Gracianiana mestoni*) were collected in 1922 in northwest Queensland, one of the wettest parts of Australia. *G. mestoni* grows on the slopes of the Bellenden Ker Range, at an altitude of 2000-4700 feet. *M. inodora* was found in the dense rain forest at the foot of the range, and many trees were fruiting heavily. It forms a shrub or small tree 8-12 feet high. The fruit is 8-celled, bright lemon yellow when ripe, oblong, and may be smooth or ribbed. The larger fruits are $2\frac{1}{2}$ x $1\frac{1}{4}$ inches, but the average is somewhat smaller.—R. C. Cook.

FLORICULTURE AND ORNAMENTAL HORTICULTURE

3320. ANONYMOUS. *Clematis Jackmani.* Nation. Nurseryman 31¹: 9. 1923.

3321. BEVAN, W. *Otto of roses.*—Distillation at Malikouri, 1922. Cyprus Agric. Jour. 17: 68. 1922.—The departmental still at Malikouri extracted April 24-May 14, 1922, 130 drams of rose oil from 1416 okes of roses, a somewhat lower percentage than that of previous years. An attempt is being made to establish a commercial rose oil industry.—Wm. Stuart.

3322. BOYNTON, KENNETH R. *Anoda hastata.* Addisonia 7: 27-28. Pl. 238 (colored). 1922.—An ornamental, annual, herbaceous species of the family Malvaceae, native of Mexico, Central America, and the West Indies. It may be grown in flower beds in the open as far north as New York.—T. J. Fitzpatrick.

3323. BOYNTON, KENNETH R. *Aria latifolia.* Addisonia 7: 1. Pl. 225 (colored). 1922.—A beam-tree of the mountain ash group of the apple family, native of central Europe, was first found in the 18th century in the forest of Fontainebleau and is supposed to be a hybrid. It is a deciduous tree and hardy in the latitude of New York, where it has been grown for many years.—T. J. Fitzpatrick.

3324. BOYNTON, KENNETH R. *Billbergia saundersii.* Addisonia 7: 7. Pl. 223 (colored). 1922.—This is an ornamental epiphytic herb of the family Bromeliaceae, native of Brazil.

In 1871 it was exhibited before the Royal Horticultural Society of England by W. W. Saunders, after whom it was named.—*T. J. Fitzpatrick.*

3325. BOYNTON, KENNETH R. *Styrax japonica*. *Addisonia* 7: 13. *Pl. 231 (colored)*. 1922.—This shrub or small tree, with bellshaped, nodding, white flowers, is a native of China and Japan. It was introduced into England in 1862 and into the U. S. A. shortly before 1891.—*T. J. Fitzpatrick.*

3326. BOYNTON, KENNETH R. *Verbena erinoides*. *Addisonia* 7: 11. *Pl. 230 (colored)*. 1922.—This moss verbena, a native of Peru and Chile, is a branching annual herb, ornamental and suitable for borders.—*T. J. Fitzpatrick.*

3327. BRITTON, N. L. *Crotalaria retusa*. *Addisonia* 7: 47. *Pl. 248 (colored)*. 1922.—This ornamental annual species is a native of tropical regions, and extends northward into southern Florida and Bermuda.—*T. J. Fitzpatrick.*

3328. BRITTON, N. L. *Polystachya minuta*. *Addisonia* 7: 19. *Pl. 234 (colored)*. 1922.—This epiphytic orchid, native of Florida, the West Indies, and South America, is the type species of this large genus. The type locality is French Guiana.—*T. J. Fitzpatrick.*

3329. BRITTON, N. L. *Xylophylla epiphyllanthus*. *Addisonia* 7: 31, 32. *Pl. 240 (colored)*. 1922.—This ornamental shrub, native of the West Indies is a member of the Euphorbiaceae. In Jamaica there are 10 species of this genus, only 1 of which, *Xylophylla epiphyllanthus*, occurs in the other West Indian Islands and in Brazil.—*T. J. Fitzpatrick.*

3330. FAIRCHILD, DAVID. *Garden for the propagation of tropical and subtropical plants*. *Science* 57: 166–168. 1923.—The Chapman Field air station of 850 acres, located on Biscayne Bay, near Miami, Florida, has been turned over to the U. S. Department of Agriculture. This tract will be used for the experimental cultivation and distribution of tropical plants useful for food or for their products. A test orchard and arboretum will be built up to preserve such valuable and beautiful trees and shrubs of foreign countries as are adapted to the soil and climate.—*C. J. Lyon.*

3331. FOX, HELEN M. *Lilium candidum*. *Addisonia* 7: 51, 52. *Pl. 250 (colored)*. 1922.—The Madonna lily, native of the regions about the Mediterranean and the Black sea, is a handsome garden species and is frequently cultivated.—*T. J. Fitzpatrick.*

3332. FOX, HELEN M. *Lilium croceum*. *Addisonia* 7: 63, 64. *Pl. 256 (colored)*. 1922.—This attractive lily, native of the alpine regions of Europe, has long been in cultivation and a number of varieties are grown. Crosses with *Lilium tigrinum* have been obtained.—*T. J. Fitzpatrick.*

3333. FOX, HELEN M. *Lilium speciosum*. *Addisonia* 7: 55, 56. *Pl. 252 (colored)*. 1922.—This handsome species, native of China and Corea, 1st imported to Europe in 1832, later to the U. S. A., is a favorite garden plant.—*T. J. Fitzpatrick.*

3334. GILMORE, MELVIN R. *State historical parks of North Dakota*. *Collections State Hist. Soc. North Dakota* 6: 226–266. 1920.—The function of such a park, particularly regarding the preservation of native plants, is discussed and a list is given of "trees, shrubs, vines, herbaceous flowering plants and grasses native to North Dakota and suitable and desirable for use in planting of parks." Many notes descriptive of the plants, their habits, and their use by the Indians are included.—*O. A. Stevens.*

3335. GLEASON, H. A. *Hamamelis mollis*. *Addisonia* 7: 9, 10. *Pl. 229 (colored)*. 1922.—This shrub, known as the Chinese witch-hazel, is a native of the provinces Hupeh and

Kiangsi, China, and it is occasionally planted in America. All species of this genus are worthy of cultivation.—*T. J. Fitzpatrick.*

3336. GLEASON, H. A. *Lopezia hirsuta*. *Addisonia* 7: 35, 36. *Pl. 242 (colored)*. 1922.—This small shrub of the Onagraceae, native of central and southern Mexico, and recently introduced into the U. S. A., is easily cultivated in conservatories.—*T. J. Fitzpatrick.*

3337. GLEASON, H. A. *Trichosporum pulchrum*. *Addisonia* 7: 43, 44. *Pl. 246 (colored)*. 1922.—This ornamental epiphyte belonging to the Gesneriaceae, native of Java, and suitable for warm-house cultivation, was discovered nearly a century ago and shortly afterwards introduced into English horticulture. It has only recently received attention in the U. S. A.—*T. J. Fitzpatrick.*

3338. GLOVER, C. C. *Quamasia esculenta*. *Addisonia* 7: 29, 30.. *Pl. 239 (colored)*. 1922.—This ornamental wild hyacinth, a native of the central U. S. A., is hardy under cultivation, easily transplanted, and has an edible bulb.—*T. J. Fitzpatrick.*

3339. HOLLICK, ARTHUR. *Alnus rugosa*. *Addisonia* 7: 25, 26. *Pl. 237 (colored)*. 1922.—This is an ornamental shrub, native of eastern U. S. A. from Maine to Florida and westward to Minnesota and Texas.—*T. J. Fitzpatrick.*

3340. MACKENZIE, K. K. *Viburnum cassioides*. *Addisonia* 7: 17. *Pl. 233 (colored)*. 1922.—This viburnum is found in low damp grounds and ranges from Newfoundland to Manitoba and southward through eastern and central U. S. A. to North Carolina. It is of medium quality as an ornamental shrub. The fruit is edible, but of little value.—*T. J. Fitzpatrick.*

3341. ROSE, J. N. *Echinocereus baileyi*. *Addisonia* 7: 41. *Pl. 245 (colored)*. 1922.—This ornamental species of the cactus family, native to Oklahoma, was 1st discovered in 1904.—*T. J. Fitzpatrick.*

3342. RUSK, HESTER M. *Lilium warleyense*. *Addisonia* 7: 57, 58. *Pl. 253 (colored)*. 1922.—This species, native of central China, and discovered in 1907, is hardy and winters in the open as far north as New England.—*T. J. Fitzpatrick.*

3343. SMALL, JOHN K. *Aconogonum polystachyum*. *Addisonia* 7: 21, 22. *Pl. 235 (colored)*. 1922.—This species of the Polygonaceae, native of central Asia, is quite ornamental and is suitable for mass effect in late borders. The article includes remarks on related species.—*T. J. Fitzpatrick.*

3344. SMALL, J. K. *Tradescantia virginiana*. *Addisonia* 7: 15, 16. *Pl. 232 (colored)*. 1922.—The common spiderwort is a native of eastern U. S. A., readily adaptive to many soils quite ornamental, and easily cultivated. It was introduced into England at least as early as the forepart of the 15th century. Linnaeus made it the type of the genus.—*T. J. Fitzpatrick.*

3345. STOUT, A. B. *Lilium canadense*. *Addisonia* 7: 61, 62. *Pl. 255 (colored)*. 1922.—This species is native to the eastern portion of North America and obtains even greater distribution in cultivation. It is used in cross breeding. Seeds readily develop, but seedlings remain below the surface the 1st year. In transplanting, the old and new bulb with connecting rootstock kept intact should be moved in late autumn.—*T. J. Fitzpatrick.*

3346. STOUT, A. B. *Lilium Parryi*. *Addisonia* 7: 49, 50. *Pl. 249 (colored)*. 1922.—This beautiful species, native of southern California, 1st noted by Dr. C. C. Parry in July, 1876, has received some attention from horticulturists but is worthy of more.—*T. J. Fitzpatrick.*

3347. STOUT, A. B. *Lilium superbum*. Addisonia 7: 59, 60. Pl. 254 (colored). 1922.—A variable species, native of eastern North America, has long been cultivated in Europe and in the U. S. A. When established after transplanting it maintains itself with little care. Hybrids have been produced with *Lilium canadense*.—T. J. Fitzpatrick.

3348. STOUT, A. B. *Lilium tigrinum*. Addisonia 7: 53, 54. Pl. 251 (colored). 1922.—This favorite garden lily, native of China and Japan, was 1st introduced into England in 1804, later into the U. S. A. Several varieties are now grown. The cultivated forms do not seed, new plants being obtained from bulblets which develop in the axils of the leaves.—T. J. Fitzpatrick.

3349. STOUT, A. B. *Nicotiana Forgetiana*. Addisonia 7: 5, 6. Pl. 227 (colored). 1922.—This highly ornamental herb, native of southern Brazil, was discovered in 1901 by Louis Forget and propagated in England by Sander and Sons. It hybridizes readily, giving a rich variety of brilliant colors.—T. J. Fitzpatrick.

3350. TAYLOR, W. H. A valuable form of barberry. New Zealand Jour. Agric. 24: 159-161. 1922.—This barberry plant, probably a form of *Berberis vulgaris*, forms a very dense hedge, 10-12 feet high and 3-4 feet thick. It blossoms profusely but rarely produces fruits, hence is not disseminated by birds. Propagation is by cuttings. It produces many suckers, but these are always close to the stool.—N. J. Giddings.

3351. WILSON, PERCY. *Amorphophallus bulbifer*. Addisonia 7: 33. Pl. 241 (colored). 1922.—This species of the Arum family, native of Asia, is easily grown in gardens. Though not popular because of the ill-smelling flower, it is frequently kept as a curiosity.—T. J. Fitzpatrick.

3352. WILSON, PERCY. *Anthurium scandens*. Addisonia 7: 23, 24. Pl. 226 (colored). 1922.—This epiphytic species of the Araceae, native of the West Indies and tropical America, was 1st figured and described by Plumier. Only a few species of this genus are cultivated.—T. J. Fitzpatrick.

VEGETABLE CULTURE

3353. BONSTEEL, J. A. Soils of eastern Virginia and their uses for truck crop production. U. S. Dept. Agric. Bull. 1005. 70 p., 1 pl., 2 fig., 6 maps. 1922.

3354. HARVEY, R. B., and R. C. WRIGHT. Frost injury to tomatoes. U. S. Dept. Agric. Bull. 1099. 10 p., 1 fig. 1922.—The frost injury to tomatoes in transit from the southern states in late winter was studied mainly, but field studies are included. A difference of only 0.89°F. was found in the freezing points between certain varieties and the average of 19 commercial varieties was 30.46°F. No consistent difference was found between early and late varieties or between ripe and full grown green tomatoes of the same variety. Undercooling to 22.63°F. was found possible, when the fruit would remain unfrozen for a limited time; but a slight jar is liable to cause freezing. A thick skin with little tendency to crack is considered an important factor in frost resistance. In the field such covering favors undercooling by preventing inoculation of the tissue from ice formed on the surface. Tomatoes on the vine freeze on the upper stem-end 1st, partly because the dew is deposited on the upper end thus tending to inoculate the surrounding tissues and partly because ripe parts may freeze more easily than green parts of the same fruit.—J. T. Buchholz.

3355. MOODIE, A. W. S., J. DOUGLASS, and B. M. ARTHUR. Field experiments with sweet potatoes. Agric. Gaz. New South Wales 33: 859-862. 1922.—In a comparison of varieties imported from the U. S. A. and the local variety Pink, the imported varieties outyielded the local in 2 out of 3 cases.—L. R. Waldron.

3356. THOMPSON, H. C., and JAMES H. BEATTIE. Sweet potato storage studies. U. S. Dept. Agric. Bull. 1063. 18 p., 4 fig. 1922.—With careful handling sweet potatoes can be stored and kept for 4 months with shrinkage and decay losses nearly $\frac{1}{2}$ that accompanying ordinary commercial handling. Those stored in houses as opposed to banks or pits, not injured in harvesting, with no sorting during storage, and kept from 50–55°F. while in storage showed considerably lower losses than usual. In the experiments all the leading varieties were tested.—A. Dorothy Bergnet.

HORTICULTURE-PRODUCTS

3357. BEVAN, W. Ground nuts from Cyprus.—Cyprus Agric. Jour. 17: 45. 1922.—Cyprus-grown ground nuts examined at the Imperial Institute, London, proved sufficiently satisfactory to justify their further cultivation. The analysis of the kernels showed 5.3 per cent moisture and 49.5 per cent of oil equivalent to 52.3 per cent from the moisture-free kernels.—Wm. Stuart.

3358. HOGG, S. A. The market for passion fruit pulp. Agric. Gaz. New South Wales 33: 899. 1922.—In 1921 pulp totaling in value £10,000 was exported to London and to the U. S. A.—L. R. Waldron.

3359. REED, J. B. By-products from crushing peanuts. U. S. Dept. Agric. Bull. 1096. 12 p., 1 fig. 1922.—Data are given on relative amounts of protein, oil, sugar, starches, and fiber in by-products from peanut crushing by various industrial processes.—J. T. Buchholz

3360. VENTRE, JULES, et EMILE BOUFFARD. La potasse et les vins anormaux de 1921. [Potassium and the abnormal wines of 1921.] Ann. Ecole Nation. Agric. Montpellier 17: 169–190. Tables 1–3. 1918–1919 [1922].—The abnormality of many of the red and white wines produced in 1921 is attributed to their high potassium content. Due to drought potassium accumulated in the soil and the grapes were supplied with an excessive amount.—F. F. Halma.

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

(See also in this issue Entries 2920, 2990, 2992, 2993, 3009, 3010, 3011, 3012, 3014, 3021, 3125, 3164, 3221, 3258, 3410, 3452, 3581, 3599, 3608)

3361. BOBILIOFF, W. Enkele gegevens over de hernieuwing van den bast bij *Hevea brasiliensis*. [Some data on bark renewal in *Hevea brasiliensis*.] Arch. Rubbercult. Nederland.-Indië 4: 239–247. 1920.—A year after a section of bark has been cut away in tapping, the renewed bark has developed nearly as many rows of latex vessels as there were in the original bark. In the renewed bark the ratio of the soft to hard parts is greater than in the original bark. As the bark grows older, rows of latex vessels toward the outside are destroyed by the development of stone cells. At the same time, new rows of vessels are developed by the cambium and as a result the number of rows of vessels remains practically constant.—C. D. LaRue.

3362. BREWSTER, A. A. Mucilage cells and raphides of *Hibbertia*. Australian Nat. 5: 76. 1923.—Needle-like crystals of calcium oxalate in faggot-like bundles are common throughout plants of *Hibbertia*. Mucilage cells in the petals seem to be for water storage.—T. C. Prye.

3363. COOK, O. F. Figs with misplaced scales. Jour. Heredity 13: 122–123. 2 fig. 1922.—The fruit of the fig represents a hollow branch with flowers on the inside, and normally small scales or bracts surround the aperture and the base of the stalk. In a seedling fig orchard at Bard, California, many abnormal figs were found with scales scattered over the surface of the fruit. Some fruits had only 1 or 2 misplaced scales. In others, the scales formed a regular spiral sequence or formed a distinct rim as though 2 fruits were partially formed, one inside the

other. The fleshy wall of the fruit evidently represents a series of internode elements completely fused, although the scales remain distinct.—*R. C. Cook.*

3364. DEMETER, KARL. Vergleichende Asclepiadeenstudien. [A comparative study of the Asclepiadaceae.] *Flora* 115: 130-176. 15 fig. 1922.—This is a study of the morphology of the flower and inflorescence of the Apocynaceae and the Asclepiadaceae. It supports the classification proposed by de Jussieu combining the 2 families into 1—the Apocynaceae.—*A. G. Stokey.*

3365. GAISBERG, E. VON. Zur Deutung der Monokotylenblätter als Phyllodien. [On the significance of monocotyl leaves as phyllodes.] *Flora* 115: 177-190. 3 pl. 1922.—The author, who disputes Arber's theory [Bot. Absts. 10, Entry 1816] that inverse bundles are an indication of phyllode morphology, believes that monocotyl leaves, especially those with expanded blades, represent another type of modification of a dicotyl leaf. The history of development gives no support for the phyllode theory, for in families where phyllodes appear, they are demonstrable as phyllodes in the history of development. This favors Goebel's view that a leaf of *Juncus*, like those of *Crantzia* and *Ottoa*, is derived by reduction from a compound leaf. Inverse bundles are due to strong growth of the under side. The narrow leaves of certain *Eryngium* species, cited by Arber as of great importance for the phyllode theory since they have bundles inversely oriented, can be derived from the palmately-veined forms by stretching until the veins gradually become parallel; or, as Möbius believes, they may correspond to the expanded mid-rib or rachis of pinnate forms, the pinnæ having been reduced. The leaves with expanded blades may have come from a radially formed leaf by broadening into a flat shape. The appendages formed at the tip of *Pontederia* leaves are not the vanishing remains of blades, but a later outgrowth, and so are not an argument for the phyllode theory.—*Anna M. Starr.*

3366. GLÜCK, H. Über die knöllchenartigen Niederblätter an dem Rhizom von *Marsilia hirsuta* A. Br. [The tubercle-like cataphylls on the rhizome of *Marsilia hirsuta*.] *Flora* 115: 251-258. 2 fig. 1922.—The land form of *Marsilia hirsuta* develops small, more or less globular cataphylls which are rich in starch. They appear singly on the rhizome or crowded on short lateral branches.—*A. G. Stokey.*

3367. HALL, WINSOME. Storage tracheides of stem of *Villarsia*. *Australian Nat.* 5: 84. 1923.—These tracheids are 5-9 cells long, often branched, full of pits, and abundant in pith and cortex.—*T. C. Frye.*

3368. KEUCHENIUS, P. E. Onderzoekingen over de bast-anatomie van *Hevea*. [Investigations on the bark-structure of *Hevea*.] *Arch. Rubbercult. Nederland.-Indië* 4: 5-24. 1920.—The average yearly increase in number of rings of latex vessels is from 3.13 ± 0.28 on good soil to 1.74 ± 0.12 on poor soil. The average number of rings of latex vessels for each mm. of bark from the cambium to the 5th mm. from the cambium is given.—*C. D. LaRue.*

3369. WELCH, M. B. The occurrence of oil ducts in certain *Eucalypts* and *Angophoras*. *Proc. Linnean Soc. New South Wales* 46: 475-486. Pl. 42-46, 7 text fig. 1921.—Oil ducts, not previously described, are formed by the linking up of a chain of short secretory cavities (corresponding in size and formation to the oil glands in the leaf) in the stems and leaves, both normal and abnormal, of certain *Eucalypts* and *Angophoras*, including: *E. Abergiana* F. v. M., *E. calophylla* R. Br., *E. corymbosa* Sm., *E. citriodora* Hook., *E. dichromophloia* F. v. M., *E. eximia* Schau., *E. ferruginea* Schau., *E. ficifolia* F. v. M., *E. foelscheana* F. v. M., *E. haematoxylon* J. H. M., *E. intermedia* R. T. B., *E. latifolia* F. v. M., *E. maculata* Hook., *E. peltata* Benth., *E. pyrophora* Benth., *E. terminalis* F. v. M., *E. trachyphloia*, *E. Watsoniana* F. v. M., and in *Angophora lanceolata* Cav. Oil ducts have not yet been found in any other genera of the *Leptospermae*, and their occurrence is purely specific. There is no direct connection between these central ducts and the leaf, petiole or stem oil glands, though both structures apparently possess an oil of similar nature. These ducts are not continuous in stem and leaves, but show

a break at the petiole. They are variable in diameter and length, ranging from 0.3 mm. to less than 0.03 mm. in diameter and from over 100 mm. to less than 1 mm. in length. They apparently function as storage reservoirs. These ducts apparently do not occur in the roots nor have they been observed in the lower portions of the stems of seedlings. In the stem, they occur in the pith only. In the leaves, they are usually 2 in number and are found only in the mid-rib. The presence of these central canals in a very limited number of Eucalypts, all belonging to the class *Corymbosae*, indicates their primitive character, and their occurrence also in 1 species of *Angophora* shows apparently a close phylogenetic affinity between *Angophora* and *Eucalyptus*.—*Eloise Gerry*.

3370. ZIJP, C. VAN. *Microtechnische mededelingen*. [Microtechnical notes.] Arch. Rubbercult. Nederland.-Indië 4: 65-68. 1920.—Benzidine chloride is recommended for coloring lignified elements in the bark of *Hevea brasiliensis*, and Sudan III for staining latex-vessels.—*C. D. LaRue*.

MORPHOLOGY AND TAXONOMY OF ALGAE

E. N. TRANSEAU, *Editor*

L. H. TIFFANY, *Assistant Editor*

(See in this issue Entries 3022, 3033, 3149, 3230, 3274, 3412, 3413, 3646)

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

(See also in this issue Entries 3033, 3149, 3230, 3274)

3371. ANONYMOUS. *Nouvelles*. Rev. Bryologique 49: 48. 1922.—Among other items of interest the discovery of *Lophozia decolorans* (Limpr.) Steph., a species new to France, is announced; it was found by Knight and Nicholson in the department of Haute-Savoie.—*A. W. Evans*.

3372. AMANN, J. *Le Thamnium mediterraneum en France*. Rev. Bryologique 49: 44-46. 1922.—The author calls attention to the discovery, in southern France, of *Thamnium mediterraneum* Bottini, a species hitherto known only from the island of Giglio, Italy. He discusses the features that distinguish this species from the widely distributed *T. alopecurum* (L.) Bryol. Eur. and compares it also with the curious submerged *T. Lemani* Schnetzler of Lake Geneva and with *T. angustifolium* Holt of England.—*A. W. Evans*.

3373. ANDREWS, A. LE ROY. Further bryophytes from North Carolina (and Tennessee). Bryologist 24: 49-58. 1921.—This article is based on a collection of bryophytes made by the author during the summer of 1919 in Buncombe, Jackson, Avery and McDowell Counties, North Carolina, and in Carter County, Tennessee. It is supplementary to previous lists, upon which there are several critical notes. The list included in the paper gives the species not hitherto reported from the region and is made up of 27 hepatics, 3 sphagna and 56 mosses, with data regarding habitat and geographic distribution for nearly every species. Many of the records represent marked extensions of range. In the case of *Grimmia Doniana* and *Plagiothecium Muellerianum* systematic notes are appended, the brood-bodies of the latter species being reported and described for the 1st time.—*E. B. Chamberlain*.

3374. BAILEY, JOHN W. *Adventures in Mossland*.—A hunt for *Desmatodon latifolius* (Hedw.) Brid. Bryologist 24: 86-88. 1921.—The author gives a semi-popular account of a hunt for *Desmatodon latifolius* near Ellensburg, Washington. Although he had collected this rare moss in the vicinity several years ago he failed to find it again, but discovered a number of even rarer species. Incidentally notes are included on the habitats of mosses growing on irrigated areas, greasewood trunks, and basalt.—*E. B. Chamberlain*.

3375. BARTRAM, EDWIN B. Some rare mosses from northeastern Pennsylvania. *Bryologist* 24: 88-89. 1921.—The author gives an account of the mosses growing on wooded limestone ledges and cliffs at the base of Indian Rock, Monroe County, Pennsylvania. He mentions 17 species, all uncommon in the general region and some of much rarity, *Didymodon rubellus* (Hoffm.) B. & S. being definitely reported for the 1st time from the state.—E. B. Chamberlain.

3376. CONKLIN, GEORGE H. Report of the curator of the hepatic department for 1921. *Bryologist* 25: 23. 1922.—The following specimens, representing extensions of range, are listed among the additions to the herbarium of the Sullivant Moss Society: *Diplophyllum gymnostomophyllum* from Wisconsin, *Lophozia obtusa* from British Columbia and Oregon, and *Neesiella rupestris* from California.—A. W. Evans.

3377. DISMIER, G. Localités nouvelles de Muscinées rares ou peu connues en France. [New localities in France for rare or little known bryophytes.] *Rev. Bryologique* 48: 49-52. 1921.—In this report, which is based largely on the author's own collections in various parts of France, 11 hepatics, 4 peat mosses and 34 true mosses are enumerated. The species are accompanied by full data regarding localities, several of which represent interesting extensions of range.—A. W. Evans.

3378. EVANS, ALEXANDER WILLIAM. Corsiniaceae, Targioniaceae, Sauteriaceae, Rebouliaceae, Marchantiaceae. *North Amer. Flora* 14: 29-66. 1923.—The author presents a taxonomic treatment of these families of the Marchantiales in accord with the other groups treated in this work. Keys are given for generic and specific identification, descriptions are included for the characterization of the families, genera and species, and synonyms, type locality, distribution, illustrations and exsiccata are cited for each species. The family Corsiniaceae is represented by 1 genus, *Corsinia*, with 1 species; Targioniaceae by 2 genera, *Targionia* and *Cyathodium*, with 1 species each; Sauteriaceae by 3 genera, *Clevea*, *Sauteria*, and *Peltolepis*, with 1 species each; Rebouliaceae by 5 genera, *Plagiochasma* (5 species), *Grimaldia* (4 species), *Cryptomitrium* (1 species), *Reboulia* (1 species), and *Asterella* (15 species); Marchantiaceae by 6 genera, *Lunularia* (1 species), *Conocephalum* (1 species), *Dumortiera* (2 species), *Bucegia* (1 species), *Preissia* (1 species), and *Marchantia* (5 species). No new species are characterized and no new combinations are made. This author is responsible for the ordinal description of the Marchantiales and the key to the 6 families. This precedes the treatment of the Ricciaceae [see *Bot. Absts.* 12, Entry 3383].—E. B. Payson.

3379. GRIER, N. M. The mosses of Washington County, Pennsylvania. *Bryologist* 25: 9-12. 1922.—This article includes a list, without annotations, of 123 species or varieties of mosses from Washington County in western Pennsylvania. This represents a revision of an earlier printed list by A. LINN and A. SIMONTON, with the addition of 13 species reported by JENNINGS. The revision was facilitated by the study of the original specimens, now in the possession of Washington and Jefferson College. A footnote gives a brief biographical notice of J. S. Simonton.—E. B. Chamberlain.

3380. GROUT, A. J. Mosses of a Staten Island house and lot. *Bryologist* 24: 64. 1921.—The author lists 20 mosses collected in a single day from a 87 x 150 ft. house lot on Staten Island, New York, and comments upon the absence from the island of arboreal mosses, although records of 25 years ago indicated their presence.—E. B. Chamberlain.

3381. HAYNES, CAROLINE COVENTRY, and MARSHALL AVERY HOWE. Sphaerocarpaceae, Riellaceae. *North Amer. Flora* 14: 2-8. 1923.—The authors present a taxonomic treatment of the order Sphaerocarpaceae and of the 2 families included under it, the Sphaerocarpaceae being represented by the genera *Sphaerocarpos* (with 4 species) and *Geothallus* (1 species) and the Riellaceae by the genus *Riella* (1 species). Keys are furnished for family, generic and specific discrimination. Descriptions are given for each category recognized; synonyms, type

locality, distribution, illustrations and standard exsiccata are cited. No new species or new combinations are included. The treatment of the order Sphaerocarpaceae is preceded by an unsigned characterization of the Division Bryophyta and the Class Hepaticae.—*E. B. Payson.*

3382. HENRY, R. *Le Lophozia Kunzeana* (Hüb.) Evans dans les Vosges et liste des muscinées recueillies au Honeck. [*Lophozia Kunzeana* in the Vosges Mountains and a list of the bryophytes collected at Honeck.] *Rev. Bryologique* 48: 60-62. 1921.—The discovery of *Lophozia Kunzeana* forma *plicata* at Honeck in the Vosges Mountains is announced, this being the 2nd French station for the species. The other bryophytes reported from the same general region include 15 mosses and 10 hepatics. Full data regarding localities are given under each.—*A. W. Evans.*

3383. HOWE, MARSHALL AVERY. Ricciaceae. *North Amer. Flora* 14: 11-27. 1923.—A taxonomic treatment of the family Ricciaceae of the Marchantiales is presented by the author. This contains descriptions of the family; of the 3 genera, *Riccia*, *Ricciocarpus* and *Oxymitra*; and of their species, *Riccia* being represented by 25 and the other 2 genera by 1 apiece. Synonyms, type locality, distribution, illustrations and exsiccata are cited for each species. No new species are described and no new combinations are made.—*E. B. Payson.*

3384. INGHAM, W. Georgian mosses. *Rev. Bryologique* 48: 43. 1921.—Under the above title 14 mosses from British Columbia are listed, no more definite data regarding localities being given. The list was based on collections made by A. Brinkman.—*A. W. Evans.*

3385. POTIER DE LA VARDE, R. Musci madurenses (contribution à la flore bryologique de l'Inde méridionale). [Mosses of Madura (contribution to the moss flora of southern India).] *Rev. Bryologique* 49: 33-44. 13 fig. 1922.—The present report is based primarily on a collection of mosses bearing the title, "Musci madurenses Indiae meridionalis exsiccata," and distributed by Foreau, with the collaboration of André, Roiné and Vellé, all of whom are missionaries in the district of Madura in southern India. The specimens were first studied by Cardot, and the new species were distributed under his manuscript names. Since there was no immediate prospect that these new species would be published by their author, Potier de la Varde has, with the sanction of Cardot, prepared an account of the entire collection, the new species appearing under their joint authorship. In this first installment of the work, 23 species are enumerated, with full data regarding stations and collectors and usually with critical remarks. The following are proposed as new: *Campylopus Andreanus*, *C. Roinéi*, *Dicranella denticulata*, *D. stricticaulis*, *Dicranum dilatinerve*, *Hyophila validinervis*, *H. viridula*, *Syrrophodon calymperoides*, *S. leucophanoides*, *Thysanomitrium Depallieri*, *T. Foreanum*, *T. leioneuron*, and *Weisia macrospora*. All the new species are illustrated.—*A. W. Evans.*

MORPHOLOGY AND TAXONOMY OF FUNGI, LICHENS, BACTERIA, AND MYXOMYCETES

H. M. FITZPATRICK, *Editor*

D. S. WELCH, *Assistant Editor*

(See also in this issue Entries 2978, 3414, 3435, 3436, 3437, 3465, 3496, 3497, 3509, 3519, 3552)

FUNGI

3386. ANONYMOUS. Pathological herbarium notes 5. U. S. Dept. Agric. Bur. Plant Indust. Office Path. Collections. 7 p. 1922.—In this number the 2386 accessions to the herbarium added between April 1 to November 1, 1922, are listed.—*H. M. Fitzpatrick.*

3387. ARTHUR, JOSEPH CHARLES. (Uredinales) Aecidiaceae. *North Amer. Flora* 7: 481-540, 541-604. 1922.—The author with his collaborators continues his treatment of the North American rusts. Keys to the species of each genus are included. Each species is charac-

terized by the citation of synonyms, a specific description, citation of host plants, type locality, distribution, illustrations, and standard exsiccati. The treatment of the genus *Klebahnia*, continued from the previous part, is completed. *Bullaria* with 66 species is treated in collaboration with EDWIN BUTTERWORTH MAINS. Forty-seven of these species are new combinations in the genus. *Teleutospora* with 11 species is offered in collaboration with GUY RICHARD BISBY. Eight new specific combinations are made. *Micropuccinia* with 149 species and 86 new specific combinations is published in collaboration with HERBERT SPENCER JACKSON. A key is given to the form genera *Uromyces* (10 species), *Puccinia* (43 species), *Uredo*, *Aecidium*, *Peridermium*, and *Caeoma*. No new species are characterized or new combinations made in these form genera.—E. B. Payson.

3388. BULLER, A. H. R. *Researches on fungi. Vol. II. Further investigations upon the production and liberation of spores in Hymenomycetes* xii + 492 p., 157 fig. Longmans, Green and Co.: London, 1922.—A comparison of the basidium of the Hymenomycetes with that of the Gastromycetes shows that the former is to be regarded as a much specialized organ for spore discharge. In all the Hymenomycetes studied the discharge of the spore from the basidium is preceded by the exudation of a small droplet of fluid substance from the hilum and followed soon by the collapse of the basidium. In the development of the spore a longer time is required for those having thick, pigmented or sculptured walls. After attaining their full size spores take still longer to ripen. Abnormal or sterile fruit-bodies are often caused by parasites or unknown agencies. Changes in condition may greatly affect size of fruit-bodies of *Coprinus lagopus*. *Marasmius oreades* may be successfully cultivated for food. *Hydnum septentrionale* probably liberates its spores in a constant stream, as do the Hymenomycetes in general. In the autumn *Fomes fomentarius* develops its new annual tube layer and the spores are liberated the following spring; each annual layer may produce spores 4 years in succession. This species shows a striking adaptation in its response to the action of gravity. *Fomes applanatus* attacks upwards of 50 species of trees, liberates about 30 billion spores in 24 hours and has a spore-fall period of over 6 months (the longest known). In the Hymenomycetes in general the most watery fruit-bodies have the shortest spore-fall period. In order to maintain themselves it is necessary for wood-destroying fungi to produce vast numbers of spores. In the Hydnaceae, Tremellaceae and Clavariaceae the form of the fruit body is intimately correlated with the size and spore-discharging power of the basidia. *Dacryomyces deliquescens* has oidial and basidial fruit-bodies which have been regarded by some as different species. The galls formed by *Exobasidium* enable the parasite to extend its hymenial surface. The red squirrel of North America collects fleshy fungi in autumn, stores them in dry places and eats them during the winter. Slugs feed upon most species of fleshy fungi growing in woods, even poisonous species being eaten. The slug uses its sense of smell in locating fungi. The Agaricineae are divided into two types, based on the organization of the hymenium, (1) the Aequi-hymeniiferae or Non-Coprinus type and (2) the Inaequi-hymeniiferae or Coprinus type. In the *Panaeolus* sub-type, of which *Panaeolus campanulatus* is taken as an example, the gills are mottled, and each area is found to give rise to successive generations of basidia which ripen their spores and then collapse. The areas are thus constantly changing. The author has figured the hymenium during several stages, giving a complete and detailed analysis of the elements and their behavior. The same is done for *Stropharia semiglobata*, *Anellaria separata* and *Psalliota* (*Agaricus*) *campestris*. A very detailed account of the morphology and biology of the last named species is given, and the hymenium is figured and minutely described. *Secotium agaricoides* resembles a puff-ball but is closely related to *Psalliota*.—D. S. Welch.

3389. BÜREN, GÜNTHER VON. *Weitere Untersuchungen über die Entwicklungsgeschichte und Biologie der Protomycetaceen.* [Further investigations of the development and biology of the Protomycetaceae.] Beitr. Kryptogamenflora Schweiz 5: 1-94. Pl. 1-2 (1 colored), fig. 1-27. 1922.—The long continued investigations on which this paper was based constitute a detailed cultural and morphological study of the species of the Protomycetaceae. Cross inoculations on a wide range of host plants show that *Protomyces macrosporus* Unger is represented by at least seven distinct races or biologic species as follows: f. spp. *Aegopodii*, *Heraclei*,

Chaerophylli, *Chaerifolii*, *Carvi*, *Ligustici*, and *Laserpitii*. The species is confined in its parasitism to the Umbelliferae but the various strains possess a relatively wide host range. Another species, *P. inundatus* Dang., is confined to a single host species, *Apium nodiflorum*. Several species of *Protomyces* occur on members of the Compositae. In addition to *P. pachydermus* Thüm. on *Taraxacum officinale* and *P. Kreuthensis* Kühn on *Aposeris foetida*, four new species are described and figured by the author; *P. Kriegerianus* on *Leontodon*, *P. Picridis* on *Picris*, and *P. Crepidicola* and *P. paludosae* on *Crepis*. In *Protomyces* and *Protomycopsis* the spores develop in the elongated endospore, and in *Protomyces* they copulate in pairs at maturity. In *Volkartia* they develop in the chlamydospore before the elongation of the endospore. In the genus *Taphridium*, also included in this family, the endospore fails to elongate. These points furnish the bases for generic separation. The author describes as new, *Protomycopsis Leucanthemi* Magnus and *P. Arnoldii* Magnus on *Chrysanthemum* and *Leontodon*, respectively, *P. Chrysanthemi* on *Chrysanthemum alpinum* and *P. Leontodontis* on *Leontodon autumnalis*. In the genus *Volkartia*, the species *V. umbelliferarum* (Rostr.) v. Büren and *V. rhaetica* Maire are discussed. A colored plate pictures the characteristic lesions produced on the host by various species. The copulation of spores in *Protomyces* is illustrated, the spores being shown as uninucleate and nuclear fusion following cell fusion.—H. M. Fitzpatrick.

3390. FONTOYNONT, M., et P. SALVAT. Sur une Actinomycose du Rat à Madagascar. [An actinomycosis of the rat in Madagascar.] Bull. Soc. Path. Exotique 15: 596-607. Fig. 1. 1922.—The *Actinomyces* concurrently described by Langeron [Bot. Absts. 12, Entry 3393] is here treated at length. The symptoms are described in detail and a discussion of the parasite in the host and in pure culture is given. The best growth was secured in peptone glycerin gelatin with the addition of 4 per cent glucose or maltose, and in coagulated serum; in various vegetable glycerin media (potato, carrot, and turnip) less abundant growth was secured. Inoculation experiments were performed on rabbits, guinea-pigs, and rats.—G. H. Godfrey.

3391. JUEL, H. O. Cytologische Pilzstudien. II. Zur Kenntnis einiger Hemiasceen. [Cytological studies in the fungi. II. Concerning some Hemiascaceae.] Nov. Act. Reg. Soc. Sci. Upsal. Ser. 4, 5: 1-43. Pl. 1-2, fig. 1-4. 1921.—The nuclear divisions in *Endomyces decipiens* are shown to be mitotic, not amitotic as described by other authors for related forms and apparently the reduction division occurs in the ascus. In the author's previous studies on *Dipodascus albidus* no mitotic figures were seen. Reexamination of his preparations has resulted in the discovery of a fusion nucleus in spireme, and another showing the telophase of the first division. Both are figured. It is called to attention that von Büren has separated the species of *Taphridium* into two groups including in the genus *Volkartia* Maire (emend.), *V. umbelliferarum* and *V. rhaetica*, while retaining *T. algeriense* in *Taphridium*. No adverse comment is made on the recognition of two genera, but it is pointed out that *T. umbelliferarum* is the type species of *Taphridium*. Therefore as *V. rhaetica* Maire is congeneric with it *Volkartia* is a synonym for *Taphridium*, and a new genus name is necessary for the species *T. algeriense*. In *T. umbelliferarum* as in other members of the Protomycetaceae the spores are formed in a peripheral layer. Two nuclear divisions were seen to take place and it is thought that a third follows. Conjugate divisions apparently take place in the vegetative cells of the species of *Taphrina* investigated. In the asci of most of the species 3 typical mitoses occur. In *T. aurea* these divisions may be amitotic. In this species and in *T. carnea*, only one of the eight nuclei is incorporated in a spore. The ascogenous cell of *Taphrina* may be considered a chlamydospore which soon germinates, the endospore growing out into an ascus. The *Endomyces* type may have arisen from the *Dipodascus* type by a reduction in the number of nuclei. In like manner the *Taphrina* type may be derived from the type present in the Protomycetaceae.—D. S. Welch.

3392. KILLIAN, CH. Le développement du Stigmatæa Robertiani Fries. [The development of Stigmatæa Robertiani Fries.] Rev. Gén. Bot. 34: 577-588. Pl. 14-17, fig. 1. 1922.—The fruit-bodies of this fungus are found on the surface of the leaves of *Geranium Robertianum*. The fungus is confined to the surface of the epidermal layer and there is no appreciable injury to the neighboring cells. No conidial fructification has been observed. There is a thickening

of the layer of hyphae in certain places to form carpophores and within these, archicarps are formed which quickly become ascogonia, there being one in each carpophore. An antheridium develops from a neighboring cell and fertilization takes place. Ascogenous hyphae develop bearing ascus hooks. They are very short and do not branch. In the simplicity of its sexual apparatus *Stigmatea* resembles the Erysiphaceae. A remarkable similiarity is also seen when this form is compared with *Dothidella Ulmi* and *Cryptomyces Pteridis*. The lack of conidia in *S. Robertiani* is compensated for by the abundant development of ascogenous tissue. The leaves of the host remain alive all winter and conditions are favorable for continuous growth. Since there is abundant and continued growth of carpophores a complicated system of ascogenous hyphae is not necessary for a continuous production of asci and spores.—*D. S. Welch*.

3393. LANGERON, MAURICE. *Actinomyces Salvati* n. sp. nouveau Microsiphoné malgache. [A new microsiphon from Madagascar.] Bull. Soc. Path. Exotique 15: 526-528. 1922.—Salvat, Director of the Pasteur Institute of Tananarive in 1910, obtained cultures of a microsiphon from lesions in a rat [Bot. Absts. 12, Entry 3390.] These were submitted to Langeron for identification who describes it as a new species *Actinomyces Salvati*. Langeron agrees with Breed and Conn that *Actinomyces* Meyen, 1828, and *Actinomyces* Harz, 1877, are not synonymous, and places this organism in the genus *Actinomyces*.—*G. H. Godfrey*.

3394. LANGERON, MAURICE. Sur un champignon d'une otomycose brésilienne: *Sterigmatocystis Hortai* n. sp. [A fungus associated with a case of ear mycosis in Brazil.] Bull. Soc. Path. Exotique 15: 383-384. Fig. 1. 1922.—The fungus found in connection with a case of ear mycosis in Brazil was entrusted to the author for identification. It was found to be a *Sterigmatocystis*, the organism being found in a bit of the dried membrane found in the ear of the patient and in pure cultures derived from this source. The name *Sterigmatocystis Hortai* is proposed and a description given.—*G. H. Godfrey*.

3395. LANGERON, MAURICE, et P. HORTA. Note complémentaire sur le *Cladosporium Wernecki* Horta, 1921. [Complementary note on *Cladosporium Wernecki* Horta.] Bull. Soc. Path. Exotique 15: 381-383. Fig. 1. 1922.—A full description of an organism producing lesions on a patient in Brazil, the symptoms of which were described in a previous paper. The fungus shows a remarkable polymorphism. On glucose or maltose gelatine a Fumago-form appears, with roundish minutely porose elements, thick walls, sometimes distinctly colored; on carrot, a Dematium-form appears, with mycelium formed of short elements which give rise to blastospores, simple or septate, which themselves may bud. It results in the production of innumerable yeast-like forms, which give the culture a moist shiny appearance. Finally in carrot bouillon there appears a delicate mycelium which gives rise to a large quantity of conidia of the *Cladosporium* type. This polymorphism agrees with the findings of other workers in connection with organisms from similar sources, and confirms the authors in their determination of the fungus as a *Cladosporium*.—*G. H. Godfrey*.

3396. LEGER, MARCEL, et MAURICE NOGUE. Mycose à *Scopulariopsis* chez deux malades ayant des lésions cutanées rapellant la lèpre. [Mycosis due to *Scopulariopsis* in the case of two patients having cutaneous lesions resembling leprosy.] Bull. Soc. Path. Exotique 15: 654-661. Fig. 1-3. 1922.—Two patients at the hospital at Dakar showed symptoms of dermatosis which were clinically similar, and which developed the same fungus when cultured. The fungus is classified with the Fungi Imperfecti, family Conidioporeae, sub-family Sporophoreae, after the classification of Vuillemin. It differs from Vuillemin's *Acremonium potronii*, and also from Castellani's *Scedosporium*, found in cases of mycosis. The writer considers that he is dealing with a *Scopulariopsis*, his species being different from several described by Brumpt. He proposes the name *Scopulariopsis leproides* and gives cultural and morphological descriptions, clinical observations and treatment.—*G. H. Godfrey*.

3397. LEVINE, MICHAEL. The origin and development of lamellae in *Agaricus campestris* and in certain species of *Coprinus*. Amer. Jour. Bot. 9: 509-533. 2 pl., 95 fig., 12 text diagr. 1922.—Previous work on the development of the Basidiomycetes is discussed at some length.

Agaricus campestris var. *Bohemia* and var. *Columbia* (?); *Coprinus ephemerus* and *C. stercorarius* were studied. The first species was grown in a mushroom cellar, the last two on agar. Material was studied both in the fresh condition and after fixation in a variety of killing fluids. The development of all 3 species was found to be similar in general to that previously described by the author for *Coprinus micaceus*. Certain conflicting results reported by other workers are thought to be due to shrinkage and consequent tearing of the tissue produced by the fixing agent. No primary annular gill cavity was found in any of the species. The primordium of the hymenium arises as pockets of palisade cells which increase in number and form small arches. The interhyphal spaces enclosed between them are the beginnings of the gill cavities. The vertical plate of hyphae between the two arches is the rudimentary trama. The palisade cells forming the vertical walls of the arch are the rudiments of the adjacent hymenia of 2 gills. Secondary or short gills arise in a similar manner, from new pockets of palisade cells intercalated at the margin of the pileus. The short gills are attached to the stipe fundament from the beginning and do not grow downward between two old gills.—*E. W. Sinnott*.

3398. NANNIZZI, ARTURO. Sulla forma ascofora dell'*Oidium quercinum* Thüm. [On the ascospore form of the *Oidium quercinum* Thüm.] Riv. Patol. Veg. 12: 87-90. 1922.—Perithecia of *Microsphaera quercina* (Schw.) Burr. were found on *Quercus sessiliflora* and *Q. pedunculata* under conditions which seem to offer confirmation to the hypothesis of Peglion that they develop during periods of cool weather following prolonged warm weather.—*F. M. Blodgett*.

3399. OTA, M. Sur deux especes nouvelles de Dermatophytes en Mandchourie: *Microsporum ferrugineum* et *Trichophyton pedis* n. sp. [Two new species of dermatophytes in Manchuria.] Bull. Soc. Path. Exotique 15: 588-596. Fig. 1-4. 1922.—(1) A skin disease due to *Microsporum ferrugineum* is very common in Manchuria, especially among children, causing infantile baldness and a disease of the smooth skin. On the scalp it causes scaly spots which vary from 1 to several cm. in diameter and from which the hair pulls out easily. Microscopic examination of the roots of hairs from diseased spots show the presence of mycelial elements upon the surface and within the bulb. Abundant mycelium is also found within the scales. The organism is very similar to *Microsporum equinum* and *M. flavescens* but differs morphologically. Inoculations on guinea pigs were negative.—(2) In four cases of "dyshydrose" of the foot, *Trichophyton pedis* n. sp. was found. It resembles *T. niveum*, but its cultural characteristics are very different. Two types were observed, one brownish and the other violaceous in color, distinguished as *Trichophyton a* and *Trichophyton b*. The differences between the genera *Trichophyton* and *Epidermophyton* are solely clinical, there being no distinct botanical differences. It also resembles *Trichophyton ectothrix*.—*G. H. Godfrey*.

3400. PARKS, HAROLD E. The genus *Neotoma* in the Santa Cruz mountains Jour. Mammalogy 3: 241-253. 1922.—Along with notes on the habits of the wood rat, interesting information is given regarding the use of various species of Hymenogastraceae for food. The holes which the rat makes to get these fungi offer a very good means of locating the fructifications, as only the fully ripe, galatinizing ones are sought by the rats.—*C. W. Dodge*.

3401. PETCH, T. Additions to Ceylon fungi. II. Ann. Roy. Bot. Gard. Peradeniya 7: 279-322. 1922.—This paper contains the descriptions of the following new species: *Clitocybe sordida*, *Omphalia straminea*, *Hygrophorus diversicolor*, *H. mutabilis*, *H. similis*, *Russula fusco-grisea*, *Cantharellus decurrens*, *Phlebophora hyalina*, *Claudopus repens*, *Pluteus flavomarginatus*, *Pholiota badia*, *Boletus xylophilus*, *B. sylvestris*, *Polyporus inornatus*, *Fomes imitator*, *Poria endoxantha*, *P. rubescens*, *P. albocitrina*, *P. sulphurea*, *Hydnum fragile*, *H. nigrescens*, *Corticium hypochroum*, *Kordyana commelinae*, *Porothelium reticulatum*, *Cyphella flagellata*, *C. grisea*, *Dendrocypella* (gen. nov.) *setosa*, *Clavaria xylarioides*, *C. rosolana*, *C. violacea*, *Pistillaria actiniceps*, *Uromyces anotidis*, *Blastophora hedyotidis*, *Phragmidium zeylanicum*, *Uredo hypericij-japonici*, *U. meliosmae*, *U. cassiae-bicapsularis*, *U. argyreiae*, *U. phyllanthi-reticulati*, *U. cudraniae*, *U. marisci*, *U. caricicola*, *U. panici-villosi*, *U. dendrocalami*, *U. lophatheri*, *Eurotium orientale*, *Zukalia rubi*, *Zukaliopsis heveae*, *Physalospora cyperi*, *Trichosphaeria*

sparsibarba, *Desmotascus cocoes*, *Rosellinia albocincta*, *Sordaria citrina*, *S. pilosa*, *S. byssiseda*, *Sphaerella mappiae*, *S. vernoniae*, *S. senecionis*, *S. lobeliae*, *Bertia turbinata*, *B. tessellata*, *Massarina biconica*, *Lentomitia ovalis*, *Eutypa conjuncta*, *Peroneutypa variabilis*, *Melanconiella stellata*, *Thyridaria pteridis*, *Oligostroma strychni*, *Phaeodothis isachnes*, *Cladothyrium reticulatum*, *Micropetella confluens*, *Amazonia peregrina*, *Phaeoglossum* (gen. nov.) *zeylanicum*, *Phyllosticta mayilae*, *Phoma durionis*, *P. justiciae*, *P. aterrima*, *Phomopsis phaseoli*, *P. cocoes*, *Cytosporella discoidea*, *Ascochyta lobeliae*, *A. cyphomandrae*, *Hendersonia obesa*, *H. rosicola*, *H. heveae*, *Asterostomella aberiae*, *Phacodiscula cudraniae*, *Gloeosporium litseae*, *G. impatientis*, *G. cryptum*, *Colletotrichum paucisetum*, *Septogloeum dumasiae*, *Acremonium roseum*, *Verticillium niveum*, *Trichothecium parasiticum*, *Monacrosporium ovatum*, *Trichocladium olivaceum*, *Septonema exaltatum*, *S. hormiscioides*, *Heterosporium wikstroemiae*, *Helminthosporium extensum*, *H. ampullaceum*, *Tubercularia nigro-maculans*, and *Tuberculina viridis*. Numerous other previously described species are recorded from Ceylon.—E. D. Merrill.

3402. PETCH, T. Interim notes on entomogenous fungi. Ann. Roy. Bot. Gard. Peradeniya 7: 323-327. 1922.—This paper consists of the original description of *Torrubiella tenuis* from Ceylon, *T. sublintea* from Chili, *T. barda* from Chili, and *Aschersonia intermedia* from Chili.—E. D. Merrill.

3403. PETCH, T. Studies in entomogenous Fungi. II. The genera *Hypocrella* and *Aschersonia*. Ann. Roy. Bot. Gard. Peradeniya 7: 167-278. Pl. 2-7. 1921.—A general monographic treatment of the known species in the two genera named, with keys, descriptions, geographic distribution, etc. Twenty-nine species of *Hypocrella* and thirteen of *Aschersonia* are fully described and discussed. Four others of the first genus and three of the last are indicated as not having been seen by the author. Three species of *Hypocrella* are considered as doubtful, while about twenty-four species placed by various authors in the two genera are excluded. The following new names appear: *Hypocrella olivacea* Petch, *H. ceramichroa* Petch (*Hypoxylon* Berk. & Br.), *H. nectrioides* Thaxter, *H. oxystoma* Petch (*Hypocrea* B. & C.), *H. tubulata* Petch, *H. andropogonis* Petch (*Aschersonia* P. Henn.), *Aschersonia brunnea* Petch, *A. flava* Petch, *A. colomnifera* Petch, and *A. acutispora* Petch.—E. D. Merrill.

3404. RAYNAUD, M., J. MONTPELLIER, et A. LACROIX. Un case de mycétome de pied à *Nocardia madurae*, chez un indigène algérien. [A case of mycetoma of the foot in an Algerian native.] Bull. Soc. Path. Exotique 15: 379-381. 1922.—The authors report another case of mycetoma, the sixth observed in Algeria. The clinical history of the case is given in some detail. Attempts to culture the organism were at first unsuccessful, even on the most diverse culture media. Finally cultures were obtained in tubes of Sabouraud glucose gelatine containing blood, incubated at 27°C. Growth occurred after fifteen days. Transfers to tubes of the same medium gave typical reddish cultures of *Nocardia madurae*.—G. H. Godfrey.

3405. REICHENSPERGER, A. Neue eigenartige Parasiten von Termiten. [A peculiar new parasite of Termites.] Soc. Fribourgeoise Sci. Nat. Bull. 26. (1-12 of separate.) 1922.—The author describes *Termitaria Thaxteri* n. sp. on *Eutermes Ripperti*, *E. arenarius* and *Cornitermes cumulans*, and discusses other species of *Termitaria*.—C. W. Dodge.

BACTERIA

3406. LIPMAN, JACOB G., and SELMAN A. WAKSMAN. The oxidation of selenium by a new group of autotrophic microorganisms. Science 57: 60. 1923.—This is a preliminary announcement of the finding of a new autotrophic form of bacteria. It is a minute, rod-shaped bacterium, capable of obtaining its energy only from the oxidation of selenium to selenic acid.—C. J. Lyon.

3407. MILLER, E. C. L., and G. F. REDDISH. Specific terms for the proteolytic activity of anaerobes. Science 57: 23-24. 1923.—It is proposed to qualify the term "proteolytic" by such specific terms as sarcolytic (dissolution of flesh), peptolytic (dissolution of peptone), gelatinolytic (dissolution of gelatin), etc., in the interests of greater accuracy.—C. J. Lyon.

3408. OLITSKY, PETER K., and FREDERICK L. GATES. Investigations on the bacteriology of epidemic influenza. *Science* 57: 159-166. 1923.—The investigations have resulted in the isolation, from the naso-pharyngeal secretions of influenza patients, of a new organism, *Bacterium pneumosintes*. This organism is filterable, anaerobic and pathogenic for rabbits, producing infection comparable to influenza in man. Animals injected with living or killed organisms are thereafter immune. Subcutaneous injections of killed cultures into men induced the formation of specific antibodies. The blood serum of recovered influenza patients contains agglutinins for the isolated organism but that of normal persons does not. It seems reasonable, though not at this time desirable, to claim this organism to be the cause of epidemic influenza.—*C. J. Lyon*.

PALEOBOTANY AND EVOLUTIONARY HISTORY

E. W. BERRY, *Editor*

(See also in this issue Entries 2986, 2990, 3339, 3365, 3581)

3409. BERRY, EDWARD W. Tertiary plants from the Andes of Cajamarca, Peru. *Amer. Jour. Sci.* 5: 239-246. *Fig. 1-6*. 1923. The author describes the new species *Goniopteris Bravoii*, *Filicites peruanus*, and *Myrcia cajamarcana*, late Tertiary plants, from tuffs exposed near Jadibamba in the Department of Cajamarca in northern Peru. These indicate considerable uplift since they were fossilized.—*E. W. Berry*.

3410. BERRY, EDWARD W. *Sagenopteris*, a Mesozoic representative of the Hydropteraceae. *Bot. Gaz.* 74: 329-331. *Fig. 1*. 1922.—The author reports the occurrence of Marsilia-like sporocarps in the lower part of the Blairmore formation of western Canada. The name *S. canadensis* is given to the material, although the writer suggests that these sporocarps doubtless belong to the widely distributed *S. elliptica* Fontaine. This material, the author believes, confirms his earlier opinion that *Sagenopteris* is related to the recent Hydropteraceae.—*B. W. Wells*.

3411. CARPENTIER, A. Revue des travaux de paleontologie végétale publiés dans le cours des années 1910-1919. 1^{re} Partie: Paléozoïque. (Suite.) [Review of the works in vegetable paleontology published during the years 1910-1919. Pt. I. Paleozoic. *Rev. Gén. Bot.* 33: 437-448, 471-477, 558-576, 653-672, 771-791. 1921. 34: 65-70, 124-133, 166-170, 237-250, 300-310, 367-375, 417-424, 463-470, 508-518, 556-563, 604-611. 1922.

3412. CHAPMAN, F. On a fossil filamentous alga and sponge-spicules forming opal nodules at Richmond River, N. S. W. *Proc. Roy. Soc. Victoria* 34: (N. S.): 167-171. *Fig. 1-2*. 1922.—Microscopical examination of sections of common opal from the diatomaceous deposits of the Richmond River at Tintenbar, New South Wales, disclosed a spicule-rock originating from fresh-water sponges and the matted thalli of a confervoid fresh water alga now silicified. This rare form is described and named *Cladophora richmondiensis*. It is attributed to the late Cenozoic, probably Pleistocene. The spicule-rock contained spicules of the *Spongilla* type. A very few traces of amphidiscs of the *Spongilla capewelli* type were seen. A few appear to resemble *Meyenia*, including a portion of what appeared to be the head of a birotulate spicule with a denticulate margin resembling *Meyenia ramsayi*.—*Eloise Gerry*.

3413. CHANEY, R. W. A fossil flora from the Puente formation of the Monterey group. *Amer. Jour. Sci.* 2: 90-92. 1921 [see Bot. Absts. 10, Entry 1264].—This formation is from the lower or middle portion of the Miocene of southern California. The previously known flora was made up of marine algae. Recent collections contain forms referable to the modern genera of marine algae, *Desmerestia* and *Lessonia*, and the following 16 forms referable to vascular land plants of moist situations: *Aralia whitneyi*, *Bumelia florissanti* (?), *Crataegus* (?) sp., *Fagopsis longifolia*, *Ficus arenaceae formis*, *Ficus* cf. *purearensis*, *Fraxinus mespilifolia*, *Fraxinus ungeri* (?), *Laurus saliciformis*, *Nelumbo* (?), *Planera myricaefolia*, *Populus crassa*, *Salix* n. sp., *Sapindus* n. sp., *Sterculea* cf. *engleri*, and *Zizyphus piperoides* (?).—*T. J. Fitzpatrick*.

3414. EDWARDS, W. N. An Eocene microthyriaceous fungus from Mull, Scotland. Trans. British Mycol. Soc. 8: 66-72. Pl. 8. 1922.—The author describes *Phragmothyrites eocenica* from coniferous leaves found in the Eocene of Mull, and considers it to be related to the existing genus *Phragmothyrium* von Höhnelt.—E. W. Berry.

3415. FENNEMAN, NEVIN M. Recent work in paleobotany. Science 57: 44-45. 1923.—The report of the Committee on Paleobotany of the Division of Geology and Geography of the National Research Council for 1921-1922 calls attention to the extended application of microscopic study of carbonaceous deposits and its practical bearing on the coal and oil industries, to the increase in instruction in paleobotany in the past year in two; and to the comparatively uncultivated field of microchemistry of plant residues.—C. J. Lyon.

3416. KERNER MARILAUN, FRITZ. Bauxite und Braunkohlen als Wertmesser der Tertiärklimate in Dalmatien. [Bauxite and wood coal as an indicator of tertiary climate in Dalmatia.] Sitzungsber. Akad. Wiss. Wien [Math.-nat. Kl.] Abt. 1, 130: 35-70. 1921 [1922].—A technically geological and meteorological presentation of the evidence as to the character of the early Tertiary climate in southern Europe afforded by the plant remains in alluvial deposit in Dalmatia. This part of Europe was at that time an archipelago, in which at various distances from the sea the climatic and floral features of seacoast, coastal plain and forest were found. First emerging from the sea in Paleocene times, it was submerged again in early Eocene, becoming a littoral region, then a mountainous coast in late Eocene; and finally a tidal flood plain and delta region in Oligocene.—The coal-containing deposits are from early Oligocene and Pliocene.—F. Weiss.

3417. KOZŁOWSKI, ANIELA. Sur les céréales fossiles néolithiques en Pologne. [Fossil cereals from the neolithic period in Poland.] Bull. Acad. Polonaise des Sci. et Lettres Cl. Math. Nat. Ser. B. Sci. Nat. 1920: 7-14. 1920.—This paper considers the first discoveries of neolithic cultivated cereals in Poland. From the caves of Ojców near Krakow and from loess layers in Złota near Sandomierz in connection with neolithic culture, the following species of wheat and rye were found: *Triticum monococcum*, *T. compactum*, *T. vulgare*, *T. Spelta*, *T. dicoccum* and *Secale cereale*. Of the wheat, the most interesting is *T. Spelta*, found for the first time in the neolithic period in Europe. Because *T. Spelta* was found together with *T. compactum* and *T. vulgare* (the last appearing in different forms), it is probable that at that time it was a natural cross. *Secale cereale* was also found for the first time in the neolithic period. Up to the time of this research it had been known only from the Bronze Age.—Aniela Kozłowska.

3418. KRYSHTOFOWICH, A. Pleuromeia and Hausmannia in Eastern Siberia, with a summary of recent contributions to the paleobotany of the region. Amer. Jour. Sci. 5: 200-208. Fig. 1-7. 1923.—This paper records stems and sporophylls of *Pleuromeia sternbergii* (Münster) Corda, an older Mesozoic survival of the Paleozoic Lepidophyta from the Triassic of Cape Jitkoff near Vladivostok in eastern Siberia. This species has been hitherto known only from the Bunter or lower Trias of central Europe. The author describes the well marked new species, *Hausmannia ussuriensis* of the lower Jurassic (tentatively referred to the Lias) from the western shore of Amur gulf near Vladivostok. In addition the author reviews recent, mostly inaccessible, contributions to the paleobotany of the region and lists both Jurassic and Permian plants from this district.—E. W. Berry.

3419. SCOTT, D. H. The early history of the land flora. Nature 110: 606-607, 638-640. 1922.—“Early history” is used to cover the Devonian and Lower Carboniferous periods, various plants of which are briefly discussed.—The morphology and probable relationships of *Rhynia*, *Hornea* and *Asteroxylon* are discussed. The discovery of these has quite changed our knowledge of early Devonian plants. The chief conclusion reached is that the main phyla are distinct.—O. A. Stevens.

3420. WALKOM, A. B. On the occurrence of Otozamites in Australia, with descriptions of specimens from Western Australia. Proc. Linn. Soc. New South Wales 46: 147-153. 1 pl. 1921.—A collection of *Otozamites* was examined from 3 miles north of the Mingenew Railway

Station (W. A.) at an altitude of 627 feet. The specimens were found in a ferruginous sandstone lying almost horizontally and little known stratigraphically. There were about 70 feet of sandstone associated with marine beds of Jurassic age below the plant-bearing bed. It is doubtful whether these were above or below the sandstone. Three species of *Otozamites* which were recognized are discussed: *O. Bechei*, *O. Feistmanteli* and *O. bengalensis*. In addition there were coniferous fragments, *Pagiophyllum* (?) sp. and *Elatocladus* (?) sp., a doubtful cone, and indeterminate fragments of wood. The occurrence of *Otozamites* throughout Australia is discussed, and their significance with reference to early climatic conditions as indicated by the flora of the "red beds" is suggested.—*Eloise Gerry*.

PATHOLOGY

FREDERICK V. RAND, *Editor*

LILLIAN C. CASH, *Assistant Editor*

(See also in this issue Entries 2917, 2927, 2940, 2941, 2963, 2978, 3105, 3118, 3124, 3126, 3140, 3170, 3180, 3207, 3212, 3254, 3258, 3270, 3284, 3288, 3306, 3313, 3314, 3354, 3386, 3387, 3389, 3390, 3393, 3394, 3395, 3396, 3399, 3404, 3408, 3414, 3493, 3555, 3558, 3565, 3567, 3568, 3641, 3642, 3643)

DISEASES CAUSED BY FUNGI

3421. ANONYMOUS. Downy mildew in South Australia. Jour. Dept. Agric. Victoria 19: 499. 1921.—This is a brief note on the occurrence of the disease.—*F. V. Rand*.

3422. BEVAN, W. *Peronospora* campaign 1922. Cyprus Agric. Jour. 17: 84-85. 1922.—An account is given of five demonstrational spraying experiments undertaken by the Cyprus Department of Agriculture for the control of *Peronospora*. Three methods of treatment were tried in each vineyard. One lot of vines was sprayed with Bordeaux mixture; another, with *Antiperonosporini*; and the third with *Solomia*, claimed to be a new fungicide and insecticide non-poisonous and harmless to vegetation. On the first two plots sulphur was applied as a preventive of *Oidium*, but none was used on the *Solomia* plot. Three, and in some cases, four applications of spray materials were made during the season. Owing to dry weather unsprayed vines showed but little injury from *Peronospora* or *Oidium*, hence the results secured were not as marked as they otherwise would have been. Nevertheless the general appearance of the sprayed vines was superior to that of the unsprayed and no *Peronospora* infection was noted.—*W. Stuart*.

3423. BISBY, G. R., J. F. HIGHAM, and H. GROH. Potato seed treatment tests in Manitoba. Sci. Agric. 3: 219-221. 1923.—Seed treatment for *Rhizoctonia* is apparently of little value in Manitoba, but early digging tends to reduce the number of sclerotia on the progeny. Treatment of tubers with formalin and corrosive sublimate checked black scurf and increased the yield. Copper sulphate is neither dependable nor safe.—*T. G. Major*.

3424. BRITTLEBANK, C. C. Seed-borne diseases. "Take All," *Ophiobolus graminis*, Sacc.: "Flag Smut," *Urocystis tritici* Koern. Jour. Dept. Agric. Victoria 19: 447. 1921.—This is a brief account of the first appearance of "flag smut" and "take all" in the United States.—*Lillian C. Cash*.

3425. COLE, C. F. A new citrus disease. (*Pythiacystis citrophthora*.) Jour. Dept. Agric. Victoria 19: 363-366. 1921.—This is a notice of the first appearance of this disease in Victoria. A description of the effects of the disease and methods of treatment are given.—*Wm. E. Lawrence*.

3426. CUNNINGHAM, G. H. The second hand fruit-case as a source of fungous-disease infection. New Zealand Jour. Agric. 24: 241-243. 1922.—Infection was readily secured by inoculations with material of the brown rot fungus (*Sclerotinia cinerea* Schroet.) from fruit-cases a month after they had contained diseased fruits. All old cases should be carefully disinfected.—*N. J. Giddings*.

3427. DORAN, WM. L. **Effect of external and internal factors on the germination of fungous spores.** Bull. Torrey Bot. Club 49: 313-340. Fig. 1-2. 1922.—The germination of spores of several different types and of seven species of fungi was studied. For parasitic fungi, germination was better when the spores were obtained from the living host rather than from artificial media. The more mature the spore, the more easily it can be germinated. A study of longevity of spores showed that viability decreased rapidly with age, the rate of such decrease depending partly on storage conditions. Temperature relations are such that spores of *Phycomycetes* can germinate at the lowest minimum temperature, followed in order by *urediniospores*, *aecio-spores*, and *teliospores of Uredinales*. The optimum temperatures, however, do not form an exactly parallel series. The time required for spore germination is decreased by approach of all conditions to an optimum. Germination takes place in either light or darkness, and in some cases in water vapor alone, that is, without precipitated moisture.—P. A. Munz.

3428. HOWITT, J. E. **Two diseases new to Ontario.** Sci. Agric. 3: 189. 1923.—Pink root of onions, caused by *Fusarium mali* Taub., and white rot of grapes, caused by *Coniothyrium diplodiella* (Speg.) Sacc. are reported as causing losses in Ontario.—T. G. Major.

3429. KAUFFMAN, C. H., and H. M. KERBER. **A study of the white heart-rot of locust, caused by *Trametes robinophila*.** Amer. Jour. Bot. 9: 493-508. 3 fig. 1922.—A locust tree attacked by this fungus was carefully studied and the diseased area in the wood traced. This may be divided roughly into 3 zones; the black border zone, a fine but distinct brownish-black line separating decayed from apparently sound wood; the lesser decayed portion, still solid in texture but much softer and lighter in texture than sound wood; and the last stages of decay, where the wood is dry and crumbling. These zones and their various constituent elements were tested for cellulose and lignin, and the lignin was found to disappear progressively as decay advanced. The normal wood and that of the 3 diseased zones was also studied histologically. The black border zone seemed quite normal except for holes in the cell walls caused by hyphae, but no mycelium was observable here. The blackish substance seems to be insoluble and its cause and character are unknown. In the lesser decayed zone the hypha holes are notably larger but no hyphae are present. In the badly decayed area the parenchyma cells and vessels are broken down and the wood is held together chiefly by the fibers. No mycelium was found here. In the apparently sound wood just outside the blackish zone, however, mycelium was found in abundance, particularly in ray cells and wood parenchyma. Compression tests of sound wood and of the apparently sound wood just outside the decayed zone showed that the latter was markedly weaker, presumably because of this "advance rot." The problem as to what becomes of the mycelium in the decayed wood is discussed.—E. W. Sinnott.

3430. MANARESI, ANGELO. **La "Sphaerotheca Mors-uvae" (Schw.) Berk. nell' Emilia.** [*Sphaerotheca Mors-Uvae* in Emilia.] Riv. Patol. Veg. 12: 83-84. 1922.—Gooseberry mildew is reported for the first time from Emilia (in Italy) in the summer of 1922 although growers said it had been present for about two years.—F. M. Blodgett.

3431. MELCHERS, LEO E., and JOHN H. PARKER. **Rust resistance in winter-wheat varieties.** U. S. Dept. Agric. Bull. 1046. 32 p., 11 pl. 1922.—Field experiments to determine the resistance to black stem rust (*Puccinia graminis tritici*) of about 100 varieties and strains of winter wheat,—many of them pure-line selections, and a few of them varieties of spring wheat,—were conducted in a rust nursery at Manhattan, Kansas, during the period 1915-17. Special methods were developed for producing severe rust epidemics under the prevailing climatic conditions of Kansas. All winter-wheat varieties grown were found to be susceptible to stem rust except Kanred and two very similar pure-line selections, P1066 and P1068. Plumpness of kernels is usually reduced by severe rust attack. Of spring wheats, Black Persian was the only bread-wheat (*Triticum vulgare*) which was found resistant, but of the durum or macaroni wheats (*T. durum*) there were several resistant varieties. Strains of emmer and einkorn gave some evidences of rust-resistance. In the non-resistant varieties prominent flecks are nearly always present in 8-12 days after inoculation, and most frequently small

uredinia are produced, but in these three varieties which are very rust-resistant flecks are very rarely visible and no uredinia were found. Reports are also given of these varieties in other states where they were in nearly all cases rust-resistant. Distinct strains of stem rust complicate the problem. Perhaps this is why these varieties were not resistant in S. D. and Minn. In Kansas, Kanred yields 3-5 bushels more per acre than the varieties commonly grown. It also ripens earlier and thus escapes some damage by drought and hot wind. It suffers less from winter injury and is equal to the common varieties in milling and baking qualities. Kanred has also proved very satisfactory with farmers and under experimental conditions in Okla., Texas, Nebr., Eastern Colo., and some other states.—*J. T. Buchholz.*

3432. NANGERONI, G. L. *Un oidio delle Cinerarie.* [An *Oidium* of *Cinerarias*.] Riv. Patol. Veg. 12: 85-86. 1922.—An *Oidium* was found attacking young *Cinerarias* but as the perithecial stage was not found the fungus was not determined. It was controlled by sulfuring and the removal of affected leaves.—*F. M. Blodgett.*

3433. RAVAZ, L., et G. VERGE. *Sur la germination des spores du mildiou de la vigne.* [The germination of spores of grape mildew.] Ann. Ecole Nation. Agric. Montpellier 17: 242-245. 1918/1919.—It was found that Bordeaux mixture prevents the germination of mildew (*Plasmopara viticola* (B. & C.) Berl. & DeT.) spores for a long time.—*F. F. Halma.*

3434. SPAULDING, PERLEY. *Investigations of the white pine blister rust.* U. S. Dept. Agric. Bull. 957. 100 p., 6 pl., 13 fig. 1922.—*Cronartium ribicola* has been found on 11 species of white pine but is not known to attack any of the pitch pines. Practically all of the cultivated species of *Ribes* and most of the wild ones have been infected naturally in every extensive outbreak area. The outbreaks of the parasite show that most of the newly formed aecia on the pines are located on nodes and internodes that are three years old or over. The aeciospores are not known to infect pines but readily infect *Ribes* leaves miles away from their source; the urediniospores are not known to infect pines but infect *Ribes* at a distance of several hundred yards. The sporidia produced by the teleospores are not known to infect *Ribes* but do infect pines. Infection by the latter is limited to between 100 and 600 yards and generally only under favorable weather conditions as they are very short lived and easily killed by desiccation. The fungus commonly overwinters on the pine by means of the mycelium, presumably in the needles and very certainly in the bark of the infected white pines. Occasionally it may overwinter by means of the aeciospores in cankers of pine bark or by the urediniospores on *Ribes* leaves, but the aeciospores produced by the overwintered mycelium in the pine bark are the principal source of infection of *Ribes* in the spring. The aeciospores carry the disease far and wide to new *Ribes* leaves and, once started, the urediniospores intensify the disease among the *Ribes* plants. The sporidia carry the disease back to those pines which are near infected *Ribes* bushes. High humidity of the air is necessary for any of the spore forms to germinate and produce infection. Periods of moist weather of 54 hours or longer occurring after June 1 may cause infection in or about the bases of the leaf fascicles of the pines. Wind has been recognized as the most efficient and active agent in the dissemination of spores, though insects and animals such as mice and squirrels are possible means of spread. Control experiments in America and Europe are discussed together with the present status of the problem of control.—*J. T. Buchholz.*

3435. STEVENS, F. L. *The Helminthosporium foot-rot of wheat, with observations on the morphology of Helminthosporium and on the occurrence of saltation in the genus.* Bull. Illinois Nat. Hist. Surv. 14: 77-185. Pl. vii-xxxiv, fig. 1-23 and A-Y. 1922.—The symptoms include a rotting of the basal portion of the stem. No weft of superficial mycelium or black incrustation as described for "take-all" were observed. Various fungi were isolated by plating methods, but *Helminthosporium* was the only one constantly found. Growth on various agars is described in detail. Several *Helminthosporium* strains isolated were compared. Rice tubes gave very striking and distinctive colors with a number of the *Helminthosporiums*. The colors varied in different regions of the tube. Other grain media gave color reactions. The important constituents for color reactions seem to be in the aleurone

layer. Cereal seeds (wheat, oats, corn, rye, and barley) were disinfected and sprouted in moist chambers. These were inoculated and all became infected. Corn shoots gave the most luxuriant growth.—A study was made of environmental factors which induced variations. The quantity of nutriment available influenced growth characters. Inhibitory influences increased sporulation. Increased humidity of media (rice) increased growth, but decreased formation of sclerotia. Decreased air humidity resulted in increasing the number of conidia per conidiophore, in reducing the modal mean and length and in increasing the variability.—The optimum growth temperature was found to be about 25°C. Light caused no variations.—Nutritional conditions affected conidial length, septation and shape.—An extensive study was made of the morphology of the mycelium, conidiophores and conidia under standard conditions which are described. The cells of the mycelium are multinucleate.—Special mathematical formulae are given for determining accurately the “coefficient of longitudinal eccentricity” and “coefficient of cylindricity” of the conidia.—“The etiological relation of *Helminthosporium* (H No. 1) to foot-rot was demonstrated by its constant presence, by the absence of other parasites, and by its proved ability to cause infections and rotting under various conditions.”—Many strains of *Helminthosporium* differing morphologically were found to infect and cause rotting in the wheat seedlings. Other fungi tested sometimes infected but did not produce general rotting. “Wheat, corn, barley, rye, sorghum, Sudan-grass, and millet are more or less susceptible to rot by *Helminthosporium*.”—The second part of the article is devoted to an extensive study of saltation within the genus *Helminthosporium*.—“Saltation, possibly mutation, is common in certain races of *Helminthosporium*. Saltation is evidenced in general colony character; rate of growth; conidial production; conidial clusters; conidial length, and breadth; septation, and shape; mycelial characters, color, zonation, and sclerotial formation. Certain saltants differed so markedly from their parents as to far exceed the usually accepted specific limits. Certain correlations and tendencies of characters in saltation were noted. The saltants were, in the main, permanent in character. They were permanent through the conidia. What appeared to be reversions sometimes occurred. Efforts to produce saltations artificially failed. The saltation was not due to mixed plantings, and cannot be induced by implanting or wounding. They are not due to parasites. Saltations in abundance were derived from single conidium cultures. Numerous variations in test tube cultures are reported as probable examples of saltations.”—It is the writer’s conclusion that the *Helminthosporium* causing foot-rot belongs to the *Helminthosporium sativum* group which consists of a large number of elementary species.—An extensive bibliography is appended.—H. W. Anderson.

3436. WEBER, GEORGE F. II. *Septoria diseases of wheat*. Phytopathology 12: 537-585. Pl. 33-36, fig. 1-16. 1922.—There are 2 distinct diseases of wheat (*Triticum* sp.) produced by species of *Septoria*, (1) the “glume blotch” produced by *S. nodorum* Berk. and (2) the leaf disease produced by *S. Tritici* Desm., here designated “speckled leaf blotch.” Both diseases are quite generally distributed over Europe and North America; and either one may occasionally cause serious loss. The disease produced by *S. nodorum* has been designated “glume blotch” because of the distinct, dark brown, dead areas produced on the glumes and lemmas; but, under conditions specially favoring infection, it also attacks the leaves, the nodes, the culm, and the rachis. The diseased nodes become dark brown to almost black. On the culm the diseased areas are lighter in color and may extend over an entire internode. Inoculations were made by spraying water suspensions of pycnosporos on plants of 41 species or varieties of cereals and related grasses. Infections resulted on all the species of *Triticum*, on *Secale cereale*, and on *Poa pratensis*. In nature infections may occur during any season of the year when the temperature is sufficiently high to allow spore germination. Pycnidia formed in the fall contained pycnosporos that gave 100 per cent germination the following spring. The physiological reactions of the fungus have been studied in cultures and the results throw much light on some characteristics of the disease produced by it.—The “speckled leaf blotch,” produced by *S. Tritici*, is typically a leaf disease. No other parts of the plants are attacked. In the fall, circular or oval, light green areas, thickly dotted with the black pycnidia of the fungus, appear on the leaves of the young plants. After growth starts in the spring the spots gradually elongate

and change to a reddish-brown color. They are at first delimited by the larger veins, but finally involve and kill the entire leaf. Often the entire seedling plant is killed. The fungus was isolated and studied in cultures. Inoculations were made on wheat with conidia and pycnosporos from cultures and with pycnosporos from the host plants and the disease was reproduced in all cases. Further inoculations were made on about 40 species of cereals and grasses. Infections resulted on the leaf and leaf sheath of *Triticum* sp., on *Secale cereale*, and on *Poa pratensis* but not on any other plants inoculated. Plants of 245 varieties of winter wheat were inoculated and 100 per cent infection was obtained on all varieties. The fungous hyphae are intercellular. The pycnidia develop in the substomatal cavity.—*B. B. Higgins.*

DISEASES CAUSED BY BACTERIA

3437. GARDNER, MAX W., and JAMES B. KENDRICK. **Bacterial spot of cowpea.** *Science* 57: 275. 1923.—This rather destructive disease from Indiana is marked by maroon spots on nearly all parts of *Vigna sinensis* (L.) Endl. By isolations and inoculations the cause has been determined to be a new species, *Bacterium vignae* n. sp. Detailed morphological and cultural characteristics are given. The group number is 211.2322033. Control of the disease lies in the use of seeds from disease-free pods.—*C. J. Lyon.*

3438. RAND, FREDERICK V. **Bacterial wilt or Stewart's disease of corn.** *The Canner* 56¹⁰, Pt. II: 164-166. 1 fig. 1923.—This paper gives some of the practical results of investigations by F. V. Rand and L. C. Cash relative to bacterial wilt of corn (*Aplanobacter Stewarti* (EFS) McCul.). This is a disease of the middle and southern U. S. A. The symptoms, cause, damage done, and relation to soil and climatic conditions are discussed. Numerous data seem to indicate that soil transmission is largely a negligible factor. Seed transmission occurs but is not as important as formerly supposed, save in introducing the disease. Experimental results show that insect dissemination must be reckoned with. A close correlation exists between resistance to wilt and the length of time required to reach maturity, the late varieties being most resistant. The only practical methods of control so far known consist in planting resistant sorts, or growing susceptible varieties only in the northern border states where the disease is not known to occur.—*Frederick V. Rand.*

DISEASES CAUSED BY ANIMAL PARASITES (INSECTS NEMAS, PROTOZOANS, ETC.)

3439. DEMAREE, J. B. **Kernel-spot of the pecan and its cause.** *U. S. Dept. Agric. Bull.* 1102. 15 p., 5 fig. 1922.—According to the results of this investigation pecan kernel-spot is not due to the fungus *Coniothyrium caryogenum* Rand but to punctures of southern stink bugs (*Nezara viridula*). In 200 out of 250 clusters of Schley and Curtis pecans which were incased with wire, from five to seven specimens of the bugs were confined 5-8 weeks and 50 were left without the insects as controls. None of the latter showed any signs of kernel-spots, while of the nuts caged with bugs 97.6 per cent bore typical kernel-spot. Nuts with which bugs were confined in the laboratory developed kernel-spot in 65 hours but no microorganisms developed from these spots in Petri dish culture. No one organism was found constant in pecan kernels affected with kernel-spot. In 416 cultures of kernel-spots, 265 remained sterile, 71 grew fungi and 80 developed bacteria. Eight species of fungi and 3 of bacteria which were isolated are considered saprophytic; none of these produced typical kernel-spots. The cause of kernel-spots is "attributed entirely to the mechanical rupturing of the host cells, to the sucking of the plant juices, to the injection of toxic substances into the tissues, or to all three types of injury." Possible control measures are suggested.—*J. T. Buchholz.*

3440. FELT, E. P. **A new gall midge on rushes (Dipt., Cecidomyiidae).** *Entomol. News* 33: 166-168. 1922.—This is a description of a gall midge reared from *Juncus dudleyi* collected at Centralia, Illinois. The gall is not described, but the author indicates that it is a deformation of the fruit. This is the first definite record from *Juncus*.—*O. A. Stevens.*

3441. FRANÇA, C. Sur les flagellés parasites des latex (à propos de la note de M. Franchini). [On the flagellates of the latex.] Bull. Soc. Path. Exotique 15: 408-410. 1922.—The author refers to Franchini's discussion of his last paper on flagellosis of the Euphorbias, and defends his earlier position with regard to the rôle of the insect *Stenocephalus agilis* as the carrier of the disease in Portugal. *Stenocephalus* is considered the primitive host, in which the leptomnads develop to the metacyclic salivary forms. Besides this insect it is possible that others may transmit the disease mechanically to plants on which they feed.—G. H. Godfrey.

3442. FRANCHINI, G. Essais d'inoculation de différents protozoaires dans le latex des euphorbes. [Attempts to inoculate different protozoa into the latex of the Euphorbias.] Bull. Soc. Path. Exotique 15: 792-795. Fig. 1-2. 1922.—In a previous paper the author, with Laveran, demonstrated the possibility of infecting certain Euphorbias with cultures of *Herpetomonas ctenocephali* var. *Chattoni*. He here describes other experiments along the same line, in which flagellates from diverse sources were used to inoculate several different species of *Euphorbia*. The plants were enclosed in such a way as to prevent the entrance of insects, and check plants were provided. Two plants of *Euphorbia ipecacuanha* were infected with cultures of the kala-azar organism of Indian origin. The parasites appeared 15 to 20 days after inoculation into the latex; at first rare, they finally became numerous. Three months after the inoculation the parasites were still not infrequent. The plants turned yellow and most of the leaves fell; the stalks were arrested in their development, and the sprouts wilted, while the check plants remained in good condition. The latex of the sick plants was very pale, thin, and starch bodies were rare. Typical parasites in different stages of division and of development were readily found in the latex of the diseased plants; and, in sections of the smaller branches, also in the lactiferous vessels and even in the tissues of the plant. A plant of *Euphorbia geniculata* was successfully inoculated with *Herpetomonas Muscae-domesticae*. The parasites found in the latex resembled those in the other case described. Other inoculation attempts were mostly negative. It is considered of great interest, however, that plants were infected with protozoa of human origin.—G. H. Godfrey.

3443. FRANCHINI, G. Flagelles et amibes d'une Urticacee exotique, *Ficus parietalis*. [Flagellates and amoebae of an exotic species of the Urticaceae.] Bull. Soc. Path. Exotique 15: 399-404. Fig. 1-3. 1922.—The writer reports on a flagellate in the fruits of *Ficus parietalis* in the greenhouses of the Paris Museum. The affected fruits appear yellowish, the peel is fleshy and the inside spongy. The grayish latex is very abundant, the reaction acid. Fresh mounts of the latex show an elongate parasite sometimes with a very fine flagellum. In addition to this form which belongs close to the *Herpetomonas* group, numerous trypanosomes were seen. These were mostly larger than those found in the Euphorbias. Similar forms to those found in the fruits were seen in latex from the trunk, branches, and leaves of the plant. Cultures were made from fruits and from the trunk on Nöller plates and in Yoshida tubes, and good growth was secured, especially in the former. Histological studies of sections of fruits gave interesting results. Iron-haemotoxylin and eosin were the best stains. The thick cortical substance was not invaded uniformly by the parasites, but here and there little islets of tissue were full of them. The spongy medullary tissue was completely invaded.—G. H. Godfrey.

3444. FRANCHINI, G. Sur une amibe particulière d'une Asclépiadacée. (*Chlorocodon Whitei*.) [A specific amoeba of one of the Asclepiadaceae.] Bull. Soc. Path. Exotique 15: 393-398. Fig. 1-3. 1922.—An amoeba, differing from those previously described is reported in *Chlorocodon Whitei*, from the greenhouse of the Paris Museum. Vegetative forms show accentuated amoeboid movements, sometimes with the emission of pseudopods. The nucleus is round or diffuse, with rare vacuoles. Smaller encysted forms with thicker protoplasm have 1 to several nuclei and differentiated ectoplasm and endoplasm. Cultures on Nöller's medium show growth on the third day at 24°C. in the form of a light scum. Some of the cultured amoebae are seen to be mobile. After 10 to 15 days numerous amoebae variable in size were observed. The largest possessed long pseudopods and appeared in clumps. Some very slender amoebae measured 60-80 $\mu \times$ 4-10 μ . They showed the nucleus in one end, or, in division stages, one at

each end. Sometimes the nucleus is almost as long as the organism. Other amoebae with several pseudopods show several nuclei. Small and medium forms and encysted forms have 1 to several nuclei. Bacteria were never seen within the protoplasm of the parasites, even after contaminations were purposely introduced into the cultures. Multiplication of the amoebae took place more abundantly in the depths of the culture than on the surface. Stained mounts showed differentiation between ectoplasm and endoplasm in the large vegetative forms, and the long pseudopods were mostly ectoplasmic in structure. The nucleus is surrounded by a nuclear membrane and possesses a round nucleole. The zone between the membrane and the nucleole stains feebly and is never granular, in all respects resembling the form seen in the latex. Division is by mitosis, instead of by schizogony. These amoebae do not ingest either red blood corpuscles or bacteria from the medium.—The author is convinced that the amoebae belong to one species which he calls *Amoeba Chlorocodonis*. It lies near the group *Vahlkampfia*, differing in some respects, including the seeming lack of a flagellate stage. Nothing is known as to the possibility of an animal host, except that the organism does not ingest red blood corpuscles. In this respect it differs from other amoebae studied, especially those found in the latex of Apocynaceae.—G. H. Godfrey.

3445. FRANCHINI, G. Sur une amibe de la laitue (*Lactuca sativa*). [An amoeba from lettuce.] Bull. Soc. Path. Exotique 15: 784-787. Fig. 1. 1922.—The writer examined numerous lettuce plants in the vicinity of Bologna, finding bacteria in some but no flagellates. In a single instance amoebae were found in a plant that appeared sick, but that did not differ from other plants injured by the heat. The amoebae differed in form and dimensions, showed some movement, delicate protoplasm, rare vacuoles, and no differentiation between ectoplasm and endoplasm. The nuclei possessed nucleoli. Division forms were seen in stained mounts. Cultures were secured on Nöller's medium at about 30°C. The amoebae multiplied, and forms similar to those in the latex were seen. Some of them ingested red blood corpuscles, but this was less manifest than with those from certain Apocynaceae and Urticaceae. Encysted forms were rarely seen. It follows from the above that one can find amoebae in the Compositeae, as well as in the other latex bearing plants. Another Composite, *Lactuca virosa*, was examined, without, however, finding the parasites.—Reference is made to a paper by MUSGRAVE, W. E. and M. T. CLEGG [Amoebas: Their Cultivation and Etiologic Significance. Bur. Gov. Lab. Manila Publ. 31. 3-95. 1904.] in which they describe an amoeba found on lettuce leaves. Cultures were made on ordinary bouillon and on solid media. Experimental inoculations were performed on monkeys, and an amoebic dysentery produced. This was in a region near Manila, Philippine Islands, where amoebic dysentery is common. It is believed by the author that the present case is similar to those described in other latex bearing plants, and that the organism was deposited on the plants by insect carriers and penetrated to the interior through lesions. The organism is called *Amoeba lactucae* n. sp.—G. H. Godfrey.

INFECTIOUS CHLOROSES (MOSAIC AND PEACH YELLOWS GROUPS, ETC.)

3446. SCHULTZ, EUGENE S., and DONALD FOLSOM. A "spindling-tuber disease" of Irish potatoes. Science 57: 149. 1923.—It has been found that spindle shaped tubers are not necessarily the result of reversion or "running-out" but are the result of an infectious disease. This disease has been transmitted by tuber grafts, leaf-mutilation inoculation and in other ways. No mention is made of the specific causal organism. The tubers perpetuate the disease, which slowly reduces the yield from year to year if spindling tubers are used for propagation.—C. J. Lyon.

3447. SMITH, KENNETH M. Mosaic disease in plants. Nature 110: 668. 1922.—This is a brief note reporting the finding, in the tissue of potato plants, bodies apparently similar to those described in maize by Kunkel.—O. A. Stevens.

NON-PARASITIC DISEASES

3448. BALLARD, W. S., J. R. MAGNESS, and LON A. HAWKINS. Internal browning of the yellow Newtown apple. U. S. Dept. Agric. Bull. 1104. 24 p., 2 pl. 1922.—Certain apples when kept through a long season in cold storage develop in the fruit flesh a brown discolora-

tion called "internal browning." This trouble is not caused by a parasitic organism, but by physiological conditions within the fruit. Yellow Newtown apples from the Pajaro valley are most susceptible. Here the growing season is cool with high humidity, and the soil is very fertile. Storage at 32°F. causes much greater injury than at 36°-40°F., the latter temperatures very largely preventing serious commercial losses in yellow Newtown apples. Usually the browning increases upon removal from storage. It develops mainly in orchards having high fertility and located in the California coastal fog belt. Orchard fertilizer treatments carried on for four years have neither produced nor prevented browning. The same tree does not bear fruit susceptible to browning year after year, and fruit from a single tree varies during any one year. Apples of large size, high in sugar and acid content and from branches girdled during the growing season browned more easily than normal fruit from the same tree. Partial defoliation tends to prevent the browning. Light crops of large fruit with coarse texture favor internal browning but when heavy crops are produced little browning develops.—*J. T. Buchholz.*

DISEASES OF UNKNOWN CAUSE

3449. KEUCHENIUS, P. E. Onderzoekingen over bruine bastziekte. [Investigations of the brown bast disease.] Arch. Rubberecult. Nederland.-Indië 4: 1-3. 1920.—Bacteria were isolated from the bark of *Hevea brasiliensis* affected with the brown bast disease. Conclusive results have not been secured with inoculations of these bacteria.—*C. D. LaRue.*

GENERAL AND MISCELLANEOUS PATHOLOGICAL LITERATURE

3450. APPEL. Die Steigerung der Ernteerträge durch Beizen des Saatgutes. [Increasing yields by seed treatment.] Mitteil. Deutsch. Landw. Ges. 38: 37-39. 1923.—In this address the speaker reviews and discusses apparatus and chemicals used in Germany for the treating of seed against diseases.—*A. J. Pieters.*

3451. BEDFORD, H. W. The asal of cotton and its causes in the Sudan. Wellcome Tropie. Res. Lab. Khartoum Entomol. Sec. Bull. 17. 8 p., 2 fig. 1921.—"Asal is a term widely used in the Sudan for any gummy or sticky substance found on a plant." The asal on the cotton plant is either an exudate from the plant itself caused by an unhealthy condition, or is due to the secretions or excretions of certain insects which feed upon the plants. The plant-asal can be determined by examining the depressions and cups on the leaves and bracts and noting whether an excessive secretion is taking place from these sources; and by the entire or relative absence of asal-producing insects. In conjunction with the excessive secretion of asal, the leaves of the plant turn yellow and drop off in large numbers, together with bracts, flowers and young bolls. Insect-asal is due to the cotton aphid (*Aphis gossypii* Glover), the durable aphid, white fly, and cotton thrips (*Heliothrips indicus* Bagnall).—*Lillian C. Cash.*

3452. COOK, MELVILLE T. The origin and structure of plant galls. Science 57: 6-14. 1923.—Important conclusions developed here include those dealing with the stimulus in the case of insect galls, the nature of the resulting responses, the conditions of the plant cells that allow or qualify response, the classification of galls and the stages in their development. Galls caused by the following organisms are discussed: *Bacterium tumefaciens* (crown gall), *Bacillus radicola* (root tubercles); *Plasmodiophora brassicae* ("club root" disease); *Gymnosporangium juniperi-virginianae*, *G. globosum*, *Rhizoctonia solani*; *Pontania salicio*, *P. pomum*; and insects, including members of the Aphidae, Diptera, Acarina and Cynipidae.—*C. J. Lyon.*

3453. CUNNINGHAM, G. H. Some recent changes in the names of plant-diseases. New Zealand Jour. Agric. 24: 96-102. 1922.—Diseases of cereal, forage and root crops are discussed.—*N. J. Giddings.*

3454. EASTHAM, J. W. Fungicides. Sci. Agric. 3: 190-191. 1923.—Immunity and resistance to disease and recent developments in the use of fungicides in British Columbia are briefly discussed.—*T. G. Major.*

3455. PALMER, R., and W. P. WESTELL. Pests of the garden and orchard, farm and forest: a practical guide for the use of the estate owner, farmer, fruit grower, and gardener, concerning the insects, birds, and other animals, fungoid diseases and weeds, affecting agriculture, horticulture, and forestry; together with remedial and preventive measures. *Roy. 8vo.*, 413 p., 47 pl. (3 col.) Henry J. Drane: London, 1922.—The author aims to give in a concise and yet comprehensive way all the important pests and diseases which injure economic plants, giving information which will enable the reader to identify the cause of the trouble and eradicate it most effectively.—Part I deals with insect pests listed under their common names. A popular description of the various species is given together with the nature of the injury and the specific treatment. Part II deals in a similar way with animals other than insects. In Part III the chief characteristics and treatment for the most prevalent fungous diseases are given. Part IV deals with obnoxious weeds and methods for their destruction; Part V, with insecticides and fungicides, including the chemicals used, methods of preparing, soil sterilization, and antidotes for the poisons used in agriculture; Parts VI and VII give tables, including a table for the identification of the more important insects and diseases, and a spray calendar.—*Lillian C. Cash.*

3456. ROBEL. Heidekrankheit reiner Föhrenbestockung. [Heath disease of pure pine (*P. sylvestris*) stands.] *Zeitschr. Forst.- u. Jagdw.* 53: 321-348. 1921.—This disease attacks pure pine stands during the 4th to 10th years. It results from the destructive combination of the needle-shedding fungus (*Lophodermium pinastri*) due to the increased use of exotic seed, and a succession of dry years, which keeps the stands from closing up and encourages the entrance of heather. It occurs mostly in arid regions with sand and lime soils, and soils deficient in colloids. The root system of heather forms a dense superficial mat, which forces the pine to root in the same manner and makes it dependent entirely upon the occurrence of timely rains. It is believed that the heath humus at the same time has a toxic effect upon the pine through the medium of the nutrient materials in the soil. Careful and continuous soil cultivation will keep out heather, but this is financially impossible. Closed stands, which must be the goal of all combat measures, are necessary to prevent the entrance of heather.—*J. Roeser.*

3457. SECRÉTAIR, CHARLES. Notes séricicoles. [Notes on silk production.] *Ann. Ecole Nation. Agric. Montpellier* 17: 191-226. 1918/1919.—Silkworms showed symptoms of the fatal disease called "grasserie" when fed even part of the time with leaves of *Scorzonera Hispanica* or of *Maclura*. The results of the study of this disease were inconclusive. A bibliography on the feeding and diseases of the silkworm is appended.—*F. F. Halma.*

3458. TROTTER, A. Intorno al seccume degli aghi ed agli altri fenomeni patologici del Pino domestico (*Pinus Pinea* L.). [A blight of the needles, and other pathological phenomena of *Pinus pinea* L.] *Riv. Patol. Veg.* 12: 91-106. 4 fig. 1922.—A blight of the needles of *Pinus Pinea* L. was noted in the vicinity of Avellino, causing a yellowing and drying up of the needles proceeding from the apex toward the base, also various surface markings and the emission of drops of resin. Two fungi were found on such needles, namely *Pestalozzia Hartigi* Tubeuf and *Cladosporium Laricis* Saccardo. A list of fungi and insects recorded as affecting this pine, classified according to the parts of the plant which they attack is appended.—*F. M. Blodgett.*

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

H. W. YOUNGKEN, *Editor*

E. N. GATHERCOAL, *Assistant Editor*

(See also in this issue Entries 2957, 3048, 3123, 3199, 3200, 3272, 3301, 3370, 3507)

3459. BEVAN, W. Lavender. *Cyprus Agric. Jour.* 17: 22. 1922.—The Cyprus Agricultural Department is establishing a small lavender field for the purpose of testing its value as a source of oil. If the experiment is successful it is proposed to supply cuttings to those wishing to engage in the lavender industry.—*Wm. Stuart.*

3460. GRAHAM, ROBERT, and I. B. BOUGHTON. An outbreak of "trembles" or milk sickness. Vet. Med. 18: 31-33. 1923.—A brief résumé of the history of milk sickness with reference to *Eupatorium urticaefolium* as the causative factor is followed by an account of some experimental work which seems to confirm the *Eupatorium* theory. A history of an outbreak of the disease at Paxton, Illinois is given.—C. D. Marsh.

3461. JOHNSON, E. P. Oak poisoning—a reply. Vet. Med. 18: 70-71. 1923.—In reply to a preceding article which intimated that shinnery poisoning was really haemorrhagic septicemia, the author points out differences between haemorrhagic septicemia and oak poisoning.—C. D. Marsh.

3462. KEENAN, GEORGE L. Significance of wheat hairs in microscopical examination of flour. U. S. Dept. Agric. Bull. 1130. 7 p., 5 fig. 1923.—The author shows a significant relationship between wheat-hair count and the flour classified according to milling practices. For analytical purposes, milling processes employed in a given sample should be known; but, in general, flours made from purified middlings material show a low hair count, while flours containing lower-grade mill stocks show a much higher hair count.—J. T. Buchholz.

3463. PETRIE, JAMES M. The active principle of *Erythrophloeum Labouchei*. (Includes a section by PETRIE, J. M., and H. PRIESTLEY. Physiological action of *E. Labouchei*.) Proc. Linn. Soc. New South Wales. 46: 333-348. Pl. 23-24. 2 text fig. 1921.—*Erythrophloeum Labouchei*, *Labouchei chlorostachya* v. Mueller, *E. chlorostachys* (F. v. M.) Ballin (Leguminosæ) is the ironwood or ironbark tree endemic in northern Australia and Queensland. Twelve species of this genus are known. *E. guineense*, the Nkasa or "doom or ordeal tree" of western and central Africa has wood used for poison arrows and infusions. It contains a very poisonous alkaloid erythrophleine, as do *E. couminga* of Madagascar and *E. Fordi* of China. No poisonous material was found in *E. densiflorum* (Elmer) Merrill of the Philippine Islands. The wood of the Australian species is red and exceedingly hard, probably the hardest of all Australian timbers. It was used by the aborigines for womerahs and spear heads and has long been known to be poisonous. Much stock is killed by eating the leaves. The poison absolutely destroys the optic nerve, even a splinter of wood being dangerous and in powdered form the wood produces violent and irresistible sneezing. The formula of erythrophleine has been provisionally given as $C_{23}H_{43}O_7N$. Air dried leaves and a few beans were used in this study of the Australian species. Leaf powder was extracted with alcohol and ether and the alkaloid precipitated. From the leaves 0.002 per cent of amorphous white alkaloid was obtained and 0.03 per cent of apparently identical material from the beans. This is insoluble in water but soluble in alcohol, ether, ethyl acetate, chloroform, amyl alcohol and acidulated water. Solutions were red, strongly alkaline and bitter. Their chemical characteristics are discussed. The physiological action was observed as follows: powdered leaves are a violent external irritant and cause sneezing; solutions administered to animals cause a complete change in heart-rhythm and respiration, blood-pressure rises, and convulsive movements occur. The results obtained would refer the alkaloid to the digitalis group in its pharmacological action and it closely resembles the descriptions of erythrophleine. The properties exhibited by these alkaloids are those hitherto known to belong only to certain glucosides. A possible analogy to myrticolorin, a flavone glucoside with an astringent and very bitter taste is suggested in connection with the properties observed for the extract from *E. Labouchei*.—*Eloise Gerry*.

PHYSIOLOGY

B. M. DUGGAR, *Editor*

WILLIAM J. ROBBINS, *Assistant Editor*

(See also in this issue Entries 2924, 2933, 2993, 2998, 3005, 3150, 3164, 3226, 3258, 3281, 3297, 3303, 3354, 3406, 3407, 3427, 3448, 3452, 3581)

GENERAL

3464. ANONYMOUS. Chemistry of the plant cell. [Rev. of: GRAFE, VICTOR. *Chemie der Pflanzenzelle*. (Chemistry of the plant cell.) viii + 421 p. Gebrüder Borntraeger; Berlin,

1922.] *Nature* 110: 403-404. 1922.—The subject is treated mainly from the point of view of physical chemistry and the book shows lack of proportion and of arrangement.—*O. A. Stevens.*

3465. ANONYMOUS. *Physiology of the growing plant.* [Rev. of: MOLLIARD, M. *Encyclopedie scientifique: Bibliotheque de physiologie et de pathologie végétales: Nutrition de la plante. 1. Echanges d'eau et des substances minerales.* [Scientific encyclopedia: Plant physiology and pathology: 1. Transport of water and mineral substances.] *xiv + 395 p.* 2. Formation des substances terrires. [2. Formation of food materials.] *vi + 438 p.* Gaston Doin: Paris, 1921.] *Nature* 109: 769. 1922.—The reviewer finds that these volumes "give to the chemist much information that he does not possess although it may be well known to the botanist, and they give to the botanist a survey of chemical relationships which he might not find so easily elsewhere." It is also found, as might be expected in so extensive a treatise, that much recent work is not included, notably in the section on soils. It is suggested that adequate references should be furnished.—*B. M. Duggar.*

3466. CONARD, H. S. *Yeasts.* [Rev. of: GUILLIERMOND, A. T. *Les levures. (The yeasts.)* II. 565 p. Paris, 1912. Translated and thoroughly revised in collaboration with the original author by F. W. TANNER. *xix + 424 p.* New York, 1920 (see Bot. Absts. 8, Entry 2057).] *Bot. Gaz.* 74: 335-336. 1922.—The reviewer highly commends the original work for its "terse statements of observation and carefully balanced discussion." Regarding the later American edition the reviewer believes the translation to have been poorly done, so badly done in fact that "no one can safely use it without a copy of the original at hand." [See also Bot. Absts. 11, Entry 2742.]—*B. W. Wells.*

3467. ERRERA, L. [Published by] *Recueil de L'Institut Botanique Léo Errera.* 4: 1-653. 6 pl., 34 fig. 1920.—This volume contains reprints of 36 articles contributed by members of this botanical institute to various journals between 1884 and 1898. The majority of the articles are those contributed by Léo Errera but the following authors are also included: G. CLAUTRIAU, E. DE WILDEMAN, E. LAURENT, G. BULLOT, FR. VAN RYSSSELBERGHE, J. MASSART, J. BORDET, E. HECKEL. The majority of these articles are of physiological significance, and it is of interest to have them brought together in a single volume.—*B. M. Duggar.*

3468. FERNBACH, M. *Sur l'achèvement de la fermentation des vins restés doux.* [The completion of fermentation in wines remaining sweet.] *Bull. Officiel Direction Recherches Sci. et Indust. et Inventions* 1922²⁸: 74-79. 1922.

3469. HALLIBURTON, W. D. *The essentials of chemical physiology for the use of students.* 11th ed., *demy 8 vo, xi + 343 p.* Longmans Green & Co.: London, 1922.

3470. PAULI, WO. *Colloid chemistry of the proteins. Part 1.* Translated by P. C. L. THORNE. 140 p., 27 fig. Churchill: London; P. Blakiston's Son & Co.: Philadelphia, 1922.—This book summarizes much of the work of the author, particularly on the behavior of albumin and certain other proteins in acid and alkaline solutions, and is based on lectures delivered in 1912-13. To a degree the relevant work of other authors is included, but no attempt has been made either by the author or the translator to bring the work strictly up to date. Besides general considerations, the topics treated are conditions of stability, the electric charge on natural soluble albumin, the isoelectric reaction, salts of acids and albumin, salts of albumin and bases, alterations of state in alkali proteins, and migration velocity of the ions in salts of the globulins.—*B. M. Duggar.*

3471. PEARL, RAYMOND. *The biology of death.* 275 p. 64 fig. Lippincott Co.: Philadelphia, 1922.—From evidence adduced from general and experimental biology and from vital statistics the author attempts to establish the hypotheses that "natural death is not a necessary or inevitable consequence of life" but rather "a by-product of progressive evolution—the price we pay for differentiation and specialization of structure and function;" that

"the duration of life is an inherited character of an individual;" that "probably . . . environmental circumstances play their part in determining the duration of life largely . . . by influencing the rate at which the vital patrimony is spent."—*Carl Epling*.

3472. WINTERSTEIN, HANS [Editor]. *Handbuch der vergleichenden Physiologie*. I. *Physiologie der Körpersäfte, Physiologie der Atmung*. (2nd part. [Handbook of comparative physiology. I. Physiology of body fluids, physiology of respiration (2nd part).] 1052 p., 180 fig. Gustav Fischer: Jena, 1921.—The 2nd half of volume 1 of this work is devoted to 2 phases of the subject: (1) the physico-chemical phenomena of respiration, by Hans Winterstein; and (2) the mechanics and control of respiration, by EDWARD BABÁK. After a general introductory discussion, 20 pages are devoted to the phenomena of respiration in plants including such topics as gas exchange, the tissue atmosphere, and the oxygen reserve. The remainder of the 1st division treats of respiratory phenomena in the various groups of animals from protozoans to vertebrates. In the 2nd division of the subject there is no relation to plant work.—*B. M. Duggar*.

DIFFUSION, PERMEABILITY, ADSORPTION

3473. BETHE, A. *Der Einfluss der H-Ionenkonzentration auf die Permeabilität toter Membranen, auf die Adsorption an Eiweissolen und auf den Stoffaustausch der Zellen und Gewebe*. [The effect of hydrogen-ion concentration on the permeability of dead membranes, on adsorption by protein sols, and on the metabolism of cells and tissues.] *Biochem. Zeitschr.* 127: 18-33 Fig. 1-4. 1922.—This is a study of the dialysis relations of a number of acid, basic, and amphoteric stains to solutions of varying H-ion concentrations, to protein sols (gelatine, serum, and milk) and to yeast, bacteria, and cells of higher plants. The usual parchment membrane method was employed. The data were based on colorimetric determinations. A very marked relation between H-ion concentration and permeability was noted. Dialysis of acid stains was increased by an acid reaction and decreased by an alkaline condition. The reverse held for basic stains. Increased adsorption by proteins occurred when an acid stain in acid solution was used. A negative adsorption was found in the case of acid stains in alkaline solutions. The opposite results were obtained with basic dyes. The phenomena were reversible. Results obtained with living, single celled organisms are regarded as partially confirmatory. Cells of higher plants (*Spirogyra*, carrot, and epidermis of carnation) were also used. The author concludes that cell content rather than the plasma membrane is the determining factor in penetration of stains, and he considers that the results with living cells in general support the theory of H-ion concentration as a factor in vital staining.—*W. W. Bonns*.

3474. COLLANDER, R. *Über die Permeabilität pflanzlicher Protoplasten für Sulfosäurefarbstoffe*. [The permeability of plant protoplasts for sulphonic acid dyestuffs.] *Jahrb. Wiss. Bot.* 60: 354-410. 1921.—There is considerable disagreement in the literature concerning the permeability of acid dyes. The problem here is a quantitative consideration of all cases, including the penetration of the dye into the cell, non-penetration, and loss of natural color by the cell. The dyes used (cyanol extra, orange G, Säuregrün, Lichtgrün, Ponceau GG, Wallviolett S, brilliant orange R, Metalingelb Ia, Echtrot A, Tuchscharlach G) are listed in respect to relative reducibility in dextrose and NaHSO_3 , relative diffusibility in agar and gelatine, surface tension (by means of a stalagmometer), capillary quotient, and their partition coefficient between a mixture of diamylamine, oleic acid, and almond oil, on the one hand, and water, on the other.—In determining the concentration of the dye taken up by the cells, hand sections were cut 200-800 microns in thickness and placed in a concentrated solution. After a definite period of time the sections were removed and examined under the microscope, using the original concentrated dye for a medium. This was then diluted by definite amounts until the lightest of the cells were just perceptibly lighter than the surrounding medium, thus determining the concentration of the dye within the cells. To check his results the author then plasmolyzed the tissue in a salt solution. Detailed data are given (using the first 5 of the dyes mentioned) for the following plants: *Allium Cepa*, *Angrecum eburneum*, *Avena sativa*,

Begonia sp., *Beta vulgaris*, *Boehmeria gigantea*, *Brassica napus*, *Centaurea montana*, *Chrysanthemum* sp., *Coleus hybridus*, *Daucus carota*, *Dianthus* sp., *Eloдея densa*, *Eupatorium grandiflorum*, *Helianthus annuus*, *H. doronicoides*, *H. orientalis*, *Lemna minor*, *Lepidium sativum*, *Malva borealis*, *Oxalis* sp., *Pistia stratiotes*, *Pisum sativum*, *Pothos aurea*, *Primula sinensis*, *Rheum raponticum*, *Rhoeo discolor*, *Senecio cruentus*, *Spirogyra* sp., *Trapaeolum majus*, *Tulipa Gesneriana*, *Vicia faba*, *Zingiber zerumbet*. These experiments show that most plant cells, put into concentrated solutions of easily diffusible sulphonic acid dyes, allow the dye to penetrate only in $\frac{1}{8}$, $\frac{1}{16}$, $\frac{1}{32}$, $\frac{1}{64}$, or $\frac{1}{128}$ the original concentration, and that different plants and different histological elements of the same plant behave very differently toward a given dye. The author thinks this is due to individual differences in permeability and not to H-ion concentration. As regards the other dyes, those soluble in diamylaminol seem to be the most permeable.—A series of experiments on the concentration of the dye solution surrounding the tissue (the technique was by color comparison) showed that the lack of coloration in most of the cells was due to non-penetration rather than to penetration and subsequent reduction of the dye to a colorless compound. Controls with dead material and agar showed that any decolorization of the solution was due to adsorption of the dye by cell membranes, etc. The possibility is discussed that the relative non-penetration may be explained by Donnan's theory of membrane equilibrium, but experiments with dyes in salt solutions show that this is not the case. Work on the effect of other factors show that: (1) low temperature retards penetration, and the temperature coefficient is greater than the coefficient of diffusion; (2) narcotics retard penetration, (3) as also OH ions, but (4) polyvalent cations have no effect.—After a considerable discussion of Ruhland's ultra filter theory, Bethe's vital staining theory, Nirenstein's lipid theory, Overton's lipid theory, Traube's surface tension theory, and the electrical theory of ion permeability, the author concludes that the above results are in accord with Overton's lipid theory, with the conception of absorption, as also with the assumption that the varying permeability for dye-stuffs is dependent on electrical forces.—S. F. Cook.

3475. CROZIER, W. J. Cell penetration by acids. V. Note on the estimation of permeability changes. Jour. Gen. Physiol. 4: 723-731. Fig. 1-2. 1922.—A method is described for measuring the time of penetration of acids into the mantle tissue of *Chromodoris zebra*. The penetration of acid (dichloroacetic) into the mantle tissue is accelerated after faradic stimulation and an artificial stretching of the tissue. Brief treatment by anaesthetics retards the penetration of acid. The spontaneous outward diffusion of intracellular pigment is an inadequate criterion of permeability. Artificial tension accelerates the outward diffusion of intracellular pigment.—O. L. Inman.

3476. CROZIER, W. J. Cell penetration by acids. VI. The chloroacetic acids. Jour. Gen. Physiol. 5: 65-79. Fig. 1-9. 1922.—Measurements of the penetration of tissue taken from *Chromodoris zebra* are believed to show that a determining factor in penetration involves the establishment of a critical pH (near 3.5) in relation to superficial cell proteins. The rapidity with which this state is produced depends upon acid strength and upon some property of the acid influencing the speed of the absorption; hence it is necessary to compare acids within groups of chemical relationship. The actual speed of penetration observed with any acid is dependent upon 2 influences: (1) preliminary chemical combination with the outer protoplasm, followed by (2) diffusion.—O. L. Inman.

3477. DAVIS, CHARLES E., EARLE T. OAKES, and HAROLD H. BROWNE. Viscosity of gelatin solutions. Jour. Amer. Chem. Soc. 43: 1526-1538. 1921.

3478. EWART, A. J. On the changes of volume in a mixture of dry seeds and water. Proc. Roy. Soc. Victoria 34: 172-179. 1922.—Marked changes of the total volume are shown when dry seeds (peas, lentils, beans, barley) absorb water. If the seed coat wrinkles there is first an expansion, then a contraction, and then a final rise which is due to the production of gas in the seed. The changes are not the result of alterations of temperature. The wrinkling is due to unequally rapid absorption, partial vacuums forming under the wrinkles, this hasten-

ing the intake of water. If the seed coat does not wrinkle there is no preliminary expansion, and the contraction is due, as in gelatine, to the compression of the absorbed water.—Using methods similar to those with seeds, the contraction obtained with gelatin indicated a pressure of 20 atmospheres, but with seeds as much as 50 to 120 atmospheres were indicated. This may be due partly to the greater imbibition pressure of organized cellulose, as compared with gelatin, and partly to the influence of solutes increasing the internal pressure of the water within the seeds.—*Eloise Gerry.*

3479. HARVEY, NEWTON E. **The permeability of cells for oxygen and its significance for the theory of stimulation.** Jour. Gen. Physiol. 5: 215-222. 1922.—By use of the ciliated gill of *Mytilus*, of muscle, liver, and nerve of a frog it is demonstrated by the indicator method that living cells are as freely permeable to oxygen as dead cells and that sudden admission of oxygen to a cell cannot account for increased oxidation as a result of stimulation. Oxygen penetrates as readily as carbon dioxide among the acids and ammonia among the alkalies. More oxygen may enter a cell at high pressure, but the reacting substances (chromogen and oxidase) are kept apart by some phase boundary as long as the cell is alive. Increased oxygen concentration eventually produces injury to the cell.—*O. L. Inman.*

3480. JACOBS, M. H. **The influence of ammonium salts on cell reaction.** Jour. Gen. Physiol. 5: 181-188. 1922.—That the pH within the cell may bear no necessary relation to the pH of the medium to which the cell is exposed is shown by the fact that cells of the flowers of a hybrid *Rhododendron* with natural indicator, starfish eggs stained with neutral red, and an artificial cell in which living frog skin is used all show that increased intracellular alkalinity may be brought about by solutions of a decidedly acid reaction which contain ammonium salts. This depends upon the fact that NH_4OH is a weak base and permits a certain degree of hydrolysis of its salts, also that living cells are freely permeable to NH_4OH (or NH_3 ?) and not to mineral and many organic acids, and presumably not, at least to the same extent, to ammonium salts as such.—*O. L. Inman.*

3481. OSTERHOUT, W. J. V. **Some aspects of selective absorption.** Jour. Gen. Physiol. 5: 225-230. Table 1. 1922.—By use of the cell sap of *Valonia* it is shown that a mechanism exists which prevents certain substances (Na, Mg, Ca, SO_4) from reaching as high a concentration inside the cell as in the sea water which surrounds the cell. Potassium is trapped and accumulates in the cell in a concentration far in excess of that found in the surrounding sea water. Practically all the K in the cell exists as KCl. The concentration of Cl does not differ greatly within and without the cell. The concentrations of the various ions were determined by chemical analyses.—*O. L. Inman.*

3482. REDFERN, GLADYS M. **On the course of absorption and the position of equilibrium in the intake of dyes by discs of plant tissue.** Ann. Bot. 36: 511-522. 8 fig. 1922.—Discs 1 mm. thick of carrot, potato, artichoke, and turnip were placed in the dye solution and the amount of absorption was determined colorimetrically. Series of experiments were made with neutral red, methylene blue, methyl violet, aniline blue, eosin, and Congo red on both living and killed tissue, and the absorption curves obtained in all cases. The curves showed that equilibrium is reached more rapidly the more concentrated the dye and that the basic dyes penetrate more rapidly than the acid dyes. There was no difference in the rapidity of absorption between living and dead tissue. After mathematical analysis, the author concludes that the relation between the final internal and external concentrations of the dye may be expressed by the adsorption equation and that, consequently, adsorption must play an important part in dye penetration.—*S. F. Cook.*

3483. RUDOLFS, W. **Effect of seeds upon hydrogen-ion concentration of solutions.** Bot. Gaz. 74: 215-220. 1922.—The author finds that immersing seeds such as corn, wheat, lupine and watermelon in single salt solutions of relatively high concentration (2-7 atmospheres) induces an increase of the H-ion content. This increase reaches a maximum, the value of

which is constant for each species. In dilute solutions (0.5–0.001 atmospheres) the increase was not so great. The writer believes "that the primary factor, and the only one which could account for the rapid reaction changes in the single salt solutions here used, is that directly related to the ion absorption by the seeds, the H-ion concentration increasing as the cations are removed from solution by absorption at a more rapid rate than the anions."—*B. W. Wells.*

3484. SMITH, C. R. *Osmosis and swelling of gelatin.* Jour. Amer. Chem. Soc. 43: 1350–1366. 1921.—Gelatin was prepared free from electrolytes. The osmotic pressure of this gelatin in water is proportional to the concentration. When this gelatin sol is put into a collodion membrane and is immersed in isohydric solutions of univalent acids, or polyvalent acids ionizing as univalent acids, the same osmotic pressure is produced. Also when it is immersed in univalent bases the same osmotic pressure is produced at the same hydroxyl-ion concentration.—"Minimum osmotic pressure is produced at the iso-electric point where it is not combined with acids or alkalies. With increasing hydrogen-ion or hydroxyl-ion concentration the osmotic pressure increases to a maximum and then diminishes."—"The maximum osmotic pressure for 0.5 gm. of gelatin per 100 cc. at 10° in univalent acids or polyvalent acids ionizing as univalent acids, is reached at a hydrogen-ion concentration of 0.8 to 1.0×10^{-3} , and amounts to about 158 mm. of water. In univalent bases the maximum is reached at 0.2×10^{-3} hydroxyl-ion concentration and amounts to about 165 mm."—"Using bivalent acids or bases ionizing as such, the maximum osmotic pressure is reached at the same hydrogen-ion or hydroxyl-ion concentration as with univalent acids or bases, respectively, but amounts to about 55 mm."—"When dry gelatin is immersed in univalent acids, or polyvalent acids ionizing as univalent, it combines with equivalent amounts at the same hydrogen-ion concentration. The amount of swelling is approximately the same for all, its maximum occurring at about 4×10^{-3} hydrogen-ion concentration when one gm. of air-dry gelatin occupies a volume of 46 cc. Bivalent ionizing acids give much less swelling with a maximum at about the same point, and combine in somewhat greater equivalent amounts."—"The salt ions do not combine with gelatin but increase the absorption of acids or alkalies. They decrease swelling."—"The swelling of gelatin is the result of osmotic pressure within the jelly, with the jelly acting as an imperfectly resisting membrane, the more so when highly swollen. While the osmotic pressure at the optimum concentration of the univalent acids and bases is the same, the swelling is much less in alkalies because of the weakened membrane effect. Bivalent sulfuric acid gives the same swelling as bivalent calcium or barium hydroxide when the swelling is small and the solution is not too great.—*J. M. Brannon.*

WATER RELATIONS

3485. BURGERSTEIN, ALFRED. *Die Transpiration der Pflanzen. Zweiter Teil (Ergänzungsband).* [Transpiration. Part II.] 264 p., 18 fig. Gustav Fischer: Jena, 1920.—Burgerstein's 1st volume, *Die Transpiration der Pflanzen, Eine physiologische Monograph*, a critical summary of the work on transpiration up to that date, was published in 1904. The present volume is a continuation of that work and brings the review of literature down to the beginning of 1920. In the 1st volume 393 papers were cited and in this 2nd, an additional 505. The present volume has 32 chapters, as follows: Chap. 1 is a discussion of relative transpiration, specific transpiration, correlative transpiration, etc.; Chap. 2 includes a discussion of cobalt-paper methods, methods of collecting transpired water, automatic weighing devices and other instruments used in measuring transpiration; Chap. 3, gives new methods of measuring stomatal openings, such as the alcohol fixation method, the potometer method, the infiltration method, and the gas diffusion method; Chap. 4 discusses potometers and atmometers; Chap. 5, physics of transpiration; Chap. 6, influence of outer and inner factors, of CO₂ content of the air, and of wilting on stomatal opening, the effect of stomatal opening on rate of transpiration and the effects of diurnal changes; Chap. 7 considers the influence of external factors such as light and soil moisture on the formation and number of stomata; Chap. 8 deals with the transpiration of correlative leaves, young and old leaves, leaves in different positions on the stem, upper and lower surface, red and green leaves; Chap. 9 is on the transpiration of flowers; Chap. 10, the influence of light on transpiration; Chap. 11, the influence of air tem-

perature; Chap. 12, the influence of air humidity; Chap. 13, the influence of air movement; Chap. 14, the influence of elevation; Chap. 15, the influence of soil water content; Chap. 16 gives the influence of chemicals on transpiration, especially acids and alkalis, salts, nutrients, Bordeaux mixture, carbon dioxide, hydrogen, sulphuric acid, ether and chloroform; Chap. 17 considers the amount of transpiration of different ecological plant types; Chap. 18 treats of the determination of transpiration in different seasons and times of day; Chap. 19, of the amount of transpiration in the Mediterranean region; Chap. 20, of the amount of transpiration in the moist, warm, tropical region; Chap. 21, of the influence of transpiration on the leaf movement of Marantaceae; Chap. 22, of transpiration of bearded and beardless heads; Chap. 23 discusses the influence of transpiration on the formation of the fruiting bodies of fungi; Chap. 24 gives the influence of fungous infection on the transpiration of food plants; Chap. 25 considers the water requirement of agricultural plants; Chap. 26, the wilting of plants and the water content of the soil; Chap. 27 treats of miscellaneous features; Chap. 28, of guttation; Chap. 29, of the varied protective arrangements for decreasing the loss by transpiration; Chap. 30 considers transpiration as a necessary evil; Chap. 31, means favoring transpiration; Chap. 32, compiled material. Literature is cited. [See also Bot. Absts. 12, Entry 3490.]—*H. L. Shantz.*

3486. DIXON, H. H. **Transport of organic substances in plants.** *Nature* 110: 547-551. 1922.—The generally accepted view that the bast serves for the downward transport of materials was supported especially by Czapek's work. Deleano, however, found that leaves apparently similar often behave differently with regard to starch depletion, and showed that a leaf may be depleted in 35 hours without transport, and that depletion continues if the petioles have been killed by heat or chloroform vapor. This indicates that living elements are not essential, while Czapek believed that they were.—Apparently none of the earlier investigators made estimates of the actual amounts transported or the velocity necessary. Calculations indicate rates (20 cm. to 140 cm. per hour) which seem quite impossible in the bast. The tracheae of the wood are naturally suggested as possible channels. A reversal of the transpiration current has long been known to take place under certain conditions. It may be demonstrated by cutting the tip of a potato leaf under eosin, or by placing one side of a *Sambucus* petiole in eosin.—The work of Ricca on *Mimosa* shows that the transmission of stimuli can scarcely be by pressure waves through the bast as believed by Haberlandt. From the work of Ricca, Boyce-Jensen, Páal and Stark it appears that such transmission probably is by hormones set free in the transpiration current. The mechanism of the downward stream is unknown, but the work of Thoday on volume changes in leaves suggests a means. If these changes are accompanied by changes of permeability of the plasmatic membranes, the necessary rate of flow through the tracheae could be produced. The function of the bast may be to supply the materials to the tracheae.—*O. A. Stevens.*

3487. GORTNER, ROSS AIKEN, and WALTER F. HOFFMAN. **Determination of moisture content of expressed plant tissue fluids.** *Bot. Gaz.* 74: 308-313. 1922.—The purpose of this paper is to recommend the use of refractometers, comparable to those used by sugar manufacturers, in the determination of the moisture-solute ratio of plant sap. The authors used a high grade Abbé refractometer provided with a special sugar scale which was carefully standardized by the Bureau of Standards [U. S. A.]. This method surpasses the older one in that only 2 or 3 drops of sap are required; direct readings are made; volatile substances which may occur in the sap are included in the estimate. They believe the refractometer reading to "more nearly express the true value of the moisture content than can be obtained by any known method."—*B. W. Wells.*

3488. NICHOLS, G. E. **The Musch rain-correcting mounting for porous porcelain atmometers.** *Science* 57: 26-28. 1923.—This describes a modification of the Livingston-Thone mounting (see *Science* 52: 85-87. 1920.) Instead of the short mercury column being held in place in the upper part of a straight glass tube by glass wool, the tube is bent like a J and the mercury rests in the curve. The long arm leading up from the water reservoir to the atmometer.

eter has a side arm connecting to it about $1\frac{1}{2}$ inches from the bottom of the J and extending outward and upward. This side arm holds the mercury when the whole apparatus is inverted to fill the atmometer or remove air bubbles. This modification has been thoroughly tested in the field.—C. J. Lyon.

3489. SAYRE, J. D. Physiology of stomata of *Rumex patientia*. Science 57: 205-206. 1923.—This is a concise list of conclusions regarding the behavior of the stomata of *Rumex patientia*. Most important is the fact that it is the acidity of the guard cells that controls the opening and closing of the stoma. The acidity, itself controlled by light, affects the point of equilibrium of the starch-sugar change in the guard cells and this regulates the osmotic pressures therein.—C. J. Lyon.

3490. SHANTZ, H. L. Transpiration of plants. [Rev. of: BURGERSTEIN, A. Die Transpiration der Pflanzen. Zweiter Teil. (The transpiration of plants.) Jena, 1920 (see Bot. Absts. 12, Entry 3485).] Bot. Gaz. 73: 239-241. 1922.—Following the abstract of the volume the author states that "this work is a valuable summary and no investigation of transpiration is feasible without consulting it."—B. W. Wells.

MINERAL NUTRIENTS AND SALT RELATIONS

3491. ARRHENIUS, OLAF. Absorption of nutrients and plant growth in relation to hydrogen ion concentration. Jour. Gen. Physiol. 5: 81-87. Fig. 1-6. 1922.—By means of water culture experiments with radishes and wheat it is shown that the absorption of nutrient salt depends much upon the pH of the substrate. At maximal growth of the plant the salt intake is at a minimum. In unbalanced solutions salt intake may be greater, and different ions are differently affected. The intake of water is independent of the absorption of salts.—O. L. Inman.

3492. FERLAND, J. Les matières minérales des plantes. [The mineral content of plants.] Sci. Agri. 3: 229-230. 1923.—The ash content of plants and the function of the various minerals is outlined.—T. G. Major.

3493. GERIGER, W. F. Protective power against salt injury of large root systems of wheat seedlings. Bot. Gaz. 74: 204-209. 1922.—In this experiment wheat seedlings with roots 70-80 cm. long (class A) and seedlings with roots 8-10 cm. long (class B) were tested in 3 nutrient solutions varying in their salt content, the physiological values of which were known and were rated "good," "medium," "poor." Growth, judged from dry weight data, in the case of class A plants was approximately equal in all 3 solutions, while in the case of class B plants striking differential results were obtained in the solutions which deviated from the theoretical optimum. The conclusion was reached that "the extent of the root system appears as an important factor that affects the magnitude of growth obtainable from a given nutrient solution."—B. W. Wells.

3494. HÄGERSTRÖM, JOHAN. Über die Fällreaktion von Natrium- oder Kalziumsalze in der Pflanze als Indikator. [Microchemical proof of a dissolved calcium salt in the plant as calcium tartrate.] Beih. Bot. Centralbl. I Abt. 39: 116-127. 1922.—With a solution of the calcium salt in water, the neutral tartrate gives a beautiful crystalline precipitate of calcium tartrate. Heating hastens the reaction. Because of their size and good reflection of light, these crystals are very distinct. With this method, of the plants investigated, 7 were rich in the calcium salt, 4 contained a medium quantity, and 5 gave no trace.—L. Pace.

3495. JONES, RICHARD F. Radioactivity and physiological action of potassium. Jour. Gen. Physiol. 3: 577-584. 1922.—It has been suggested that one of the important functions of the K ion in physiological phenomena is dependent on its slight radioactive properties. The writer finds that with respect to their influence on development of sea urchin eggs and antagonistic action in salt solutions the radioactive elements Th and U are of no value as sub-

stitutes for K, while the non-radioactive elements Cs and Rb are very effective substitutes.—*Otis F. Curtis.*

3496. MELLON, RALPH R. Spontaneous agglutinability of bacteria in relation to antagonistic action of certain cations. (Abstract.) *Absts. Bact.* 6: 484. 1922.—Spontaneous agglutinability of 5 pure-line cultures of *B. diphtheriae* is shown to be a function of growth cycle developments.—*D. Reddick.*

3497. NÉMEC, ANTONÍN, und VÁCLAV KÁŠ. Über den Einfluss des Selen auf die Entwicklung einiger Schimmelpilze aus der Gattung *Penicillium*. [On the influence of selenium on the development of some mildews of the genus *Penicillium*.] *Biochem. Zeitschr.* 114: 12-22. 1921.—The writers used a modification of Raulin's nutrient solution, to which a small amount of $ZnSO_4$ and $MnCO_3$ had been added. To this standard nutrient solution Na_2SeO_3 was added in amounts varying from 1 billionth gm. in 100 cc. of solution to 1 ten thousandth gm. in 100 cc. They found that the dry weight of the mycelium of *P. Roqueforti* increased with the increase of selenium, while *P. candidum* produced the greatest dry weight in the solution having 1 ten millionth gm. of Na_2SeO_3 per 100 cc. of nutrient solution. There was also an increase in ash as the dry weight increased, but the 2 were not identical. In all cultures in which selenium was used there was a decrease of phosphorus in the ash even though the total ash content was higher than in the control.—*F. G. Gustafson.*

3498. SEVERY, HAZEL W. The occurrence of copper and zinc in certain marine animals. *Jour. Biol. Chem.* 55: 79-92. 1923.

3499. STEEL, THOMAS. The occurrence of calcium oxalate in the gidgee wattle (*Acacia Cambagei* Baker). *Proc. Linn. Soc. New South Wales* 46: 256-258. 1921.—Indication of unusual quantities of calcium in the ash of gidgee led the author to determine the amount present as calcium oxalate in the timber and bark. Oxalate is calculated as $C_2O_4Ca + H_2O$. The oxalate precipitate obtained was ignited completely and weighed as CaO. In the analysis ash soluble in acid, sand, potash, lime as oxalate, total CaO, calcium oxalate and water were determined. The proportions of calcium oxalate in the bark are the highest known to be recorded for any plant. Barks from 6 other species of *Acacia* were examined. Although varying amounts were found none showed as high a percentage as *A. Cambagei*. A variable amount of lime was present in combination other than oxalate. The bark of *A. decora* contained a comparatively large amount of ash insoluble in acid and was high in iron and alumina.—*Eloise Gerry.*

3500. WALTON, GEORGE PELHAM. Specific acidity of water extract and oxalate content of foliage of African sorrel. *Bot. Gaz.* 74: 158-173. *Fig. 1.* 1922.—A method is described which makes possible the identification of the principal sources of acidity characterizing the water extract of plant tissues. In the case of *Rumex abyssinicus* (African sorrel) it was found that "only two compounds of oxalic acid, potassium binoxalate and calcium oxalate monohydrate, occur in the leaves examined. The percentages in which these salts occur are computed from the data for acidity and total oxalate in the dried material." Corroboration of results by crystallographic methods was obtained. The writer noted the presence of a natural indicator in the leaves.—*B. W. Wells.*

PHOTOSYNTHESIS

3501. ANONYMOUS. Photosynthesis. *Nature* 110: 856-857. 1922.—Brief notes are given of papers read at a joint meeting of the sections of chemistry and botany at the Hull meeting of the British Association.—*O. A. Stevens.*

3502. BORNEMANN. Die Kohlenstoff-Ernährung der Kulturpflanzen. [The carbon nutrition of cultivated plants.] *Fühlings Landw. Zeitg.* 70: 1-7. 1920.—This constitutes a reply to the criticism by Th. Pfeiffer, Breslau, of recent work by the author, who seeks to maintain

his view that increased production in the open field as well as in an enclosed area is possible through the production of CO_2 in the soil and its consequent diffusion upwards. Reference is made to the author's work "Kohlensäure und Pflanzenwachstum," Berlin, 1920. No new work is reported.—*C. C. Epling.*

METABOLISM (GENERAL)

3503. ANONYMOUS. [Rev. of: SHERMAN, H. C., and S. L. SMITH. *The vitamins*. iii + 273 p. (Amer. Chem. Soc. Monograph Series) Chemical Catalog Co.: New York, 1922 (see Bot. Absts. 12, Entry 3517).] *Nature* 110: 6. 1922.—This book includes a bibliography of the literature to the end of the year 1921.—*O. A. Stevens.*

3504. BAUGHMAN, WALTER F., and GEORGE S. JAMIESON. *The chemical composition of soya bean oil*. *Jour. Amer. Chem. Soc.* 44: 2947-2952. 1922.—The percentage composition of the different glycerides is as follows: Linolenic acid, 2.3; linolic, 51.5; oleic, 33.4; palmitic, 6.8; stearic, 4.4; arachidic, 0.7; lignoceric, 0.1; also unsaponifiable matter, 0.6 per cent.—*J. M. Brannon.*

3505. BOBILIOFF, W. *Onderzoekingen over het zetmeel van Hevea brasiliensis*. [The starch of *Hevea brasiliensis*.] *Arch. Rubbercult. Nederland.-Indië* 4: 71-118. 1920.—Starch occurs in the cortex and in the wood of this species, while the cambium contains none. Starch storage in cells surrounding the latex vessels, and its disappearance in the cortex, when the tree is tapped, suggest that there is a close relation between latex formation and starch supply. The large amount of starch normally stored indicates that there need be no fear of depletion of food supply by tapping even during the wintering season.—*C. D. LaRue.*

3506. HARDING, T. SWANN. *The preparation of fructose*. *Jour. Amer. Chem. Soc.* 44: 1765-1769. 1922.

3507. HENRY, T. A. *The plant alkaloids*. J. & A. Churchill: London, 1922. 21 s. net.

3508. JAMIESON, GEORGE S., and WALTER F. BAUGHMAN. *The chemical composition of sunflower-seed oil*. *Jour. Amer. Chem. Soc.* 44: 2952-2957. 1922.—The following percentage composition of glycerides is found: Oleic acid, 33.4; linolic, 57.5; palmitic, 3.5; stearic, 2.9; arachidic, 0.6; lignoceric, 0.4; also unsaponifiable matter, 1.2 per cent.—*J. M. Brannon.*

3509. LARSON, L. W., and W. P. LARSON. *Factors governing the fat content of bacteria and the influence of fat on pellicle formation*. *Jour. Infect. Diseases* 31: 407-415. 1922.—An historical résumé is given of methods in fat extraction, and those used in the present paper are outlined in detail. It is concluded that carbohydrates and glycerol are converted into fat or fat-like substances only when they are not fermented by the organism, and that pellicle formation by bacteria is probably determined by the surface tension of the medium on the one hand and the fat content of the bacteria on the other. The acid-fast staining properties of the tubercle bacillus are thought to be a quality function of fat or other substances present rather than one of quantity. It is further thought that the fat content of the tubercle bacillus bears no relation to pathogenicity, but this content is determined entirely by the action of the organism on the glycerol in the medium.—*R. V. Allison.*

3510. LINK, KARL, PAUL LINK, and W. E. TOTTINGHAM. *Effects of the method of desiccation on the carbohydrates of plant tissues*. *Jour. Amer. Chem. Soc.* 45: 439-447. 1923.—The tissues used in this work were beet leaves, ears of corn, corn stalks, corn seedlings, and potato tubers. These tissues were all collected on clear days and about noon.—The alcohol method of preserving plants was used as a standard. In this method a convenient quantity of tissue, depending upon the water, was put into enough alcohol to insure a concentration of 75 per cent alcohol after dilution by the water from the tissues. A little calcium carbonate

was added, in order to neutralize any acid which might have been present, and the mixture was heated for 1 hour on a steam bath at 78°.—The results from desiccation show that a temperature of 98° should not be employed for drying tissues when the sugar and starch content are high. A temperature of 65° can be used, in an air current, with tissues that can be dried rapidly. A temperature of 80° in a vacuum is superior to 65° in a vacuum. In the case of the ear of corn a previous heating in an autoclave to inhibit enzyme action is an advantage.—A well ventilated oven which has a large volume of air circulating over the tissues allows a lower drying temperature.—“The alcohol method of preservation gave the same analytical results for carbohydrates as desiccation at 80° in vacuum, in the case of beet leaves and corn ears. The methods are, therefore, equally efficient in checking enzyme action and stopping respiration.”—*J. M. Brannon.*

3511. NOYES, H. A., H. T. KING, and J. H. MARTSOLF. **Variations in the Concord grape during ripening.** Jour. Assoc. Official Agric. Chem. 6: 197-205. 1922.—Ripening Concord grapes vary greatly in composition; this variation can not be correlated with season and date of harvesting. The weight of the individual berry remains fairly constant during ripening, although it tends to increase slightly. The sugar content of the Concord grape and grape juice increases as ripening advances, while the acid content of the juice decreases as ripening advances. Changes in the acid and sugar content of the grape and grape juice are irregular from harvesting date to harvesting date. The tannin and coloring matter content of the grape juice is very irregular. Hot-pressing increases the tannin and coloring matter content of the grape juice.—*F. M. Schertz.*

3512. OELSNER, ALICE. **Die Ergebnisse der letzten Arbeiten von Professor Dr. Alfred Koch - Göttingen.** [The results of the last work of Prof. Dr. Alfred Koch at Göttingen.] Mitteil. Deutsch. Landw. Ges. 37: 497. 1922.—At the time of his death Koch was engaged in studying the effect of certain soil bacteria on organic phosphorus compounds. In this preliminary note it is stated that certain bacteria were found to have the ability to break down the organic phosphorus compounds so that 68.5 per cent of the phosphorus was recovered as inorganic phosphorus, and 31.5 was utilized in the body of the bacteria. The full report will appear in *Biochem. Zeitschr.*—*A. J. Pieters.*

3513. POWER, FREDERICK B., and VICTOR K. CHESTNUT. **Confirmation of the occurrence of linalyl esters in peaches.** (A note). Jour. Amer. Chem. Soc. 44: 2966-2967. 1922.

3514. POWER, FREDERICK B., and VICTOR K. CHESTNUT. **The odorous constituents of apples. 2. Evidence of the presence of geraniol.** Jour. Amer. Chem. Soc. 44: 2933-2942. 1922.—The odorous constituents of the apple consist chiefly of amyl esters. The distinctly core-like odor is due to the presence of the aliphatic terpene alcohol geraniol, which is present either in the free form or as an ester.—*J. M. Brannon.*

3515. POWER, FREDERICK B., and VICTOR K. CHESTNUT. **The odorous constituents of peaches.** Jour. Amer. Chem. Soc. 43: 1725-1738. 1921.—The odorous constituents of the peach are chiefly linalyl esters of formic, acetic, valeric, and caprylic acids. There is also a considerable portion of acetaldehyde and a small amount of higher aldehydes. Some volatile acids are also present.—*J. M. Brannon.*

3516. QUISUMBING, F. A., and A. W. THOMAS. **Conditions affecting the quantitative determination of reducing sugars by Fehling's solution. Elimination of certain errors involved in current methods.** Jour. Amer. Chem. Soc. 43: 1053-1526. 1921.

3517. SHERMAN, H. C., and S. L. SMITH. **The vitamins.** Amer. Chem. Soc. Monogr. 6. 270 p. 1922.—This volume includes a brief history of the vitamine theory; a discussion of the physical, chemical and physiological properties of the 3 vitamins; a consideration of their place in the diet and their occurrence in the common foods; and an extensive bibliography. [See also Bot. Absts. 12, Entry 3503.]—*Mildred L. Johnson.*

3518. STEEL, THOS. **Chemical Notes.—Botanical.** Proc. Linnean Soc. New South Wales 46: 487-491. 1921.—Analytical data are given of the following: (1) some Australian fruits, *Eupomatia laurina* R. Br., *Ficus macrophylla* Desf., *F. Cunninghamii* Miq., *F. rubiginosa* Desf., *Podocarpus elata* R. Br., (2) Fijian wild sugar cane; (3) roots of the dragon tree, *Cordyline terminalis*; (4) calcium carbonate in wood of *Geissois Benthani* (F. v. M.) (with flinty deposit); (5) the nitrogen content of the following fungi by the Kjeldahl-Gunning method,—*Peziza fasciculosa*, *Stereum caperatum*, *S. lobatum*, *Polyporus mylittae*, *P. portentosus*, *Hexagona subtenuis*, *Hexagona* sp., *Lenzites repandra*, *Polystictus flabelliformis*, *P. sanguineus*, *Trametes Muelleri*, *T. lachnea*, *Clathrus cibarius*, *Xylostroma giganteum* (sterile mycelium of several Polyporaceae, chiefly *P. eucalyptorum* and a species of *Fomes*); and (6) the exudation (mannitol, etc.) from *Myoporum platycarpum* R. Br.—*Eloise Gerry*.

3519. VÖLTZ, W., W. DIETRICH, und A. DEUTSCHLAND. **Die Verdaulichkeit und Verwertung der Nährstoffe des Ölpilzes (*Endomyces vernalis* Ludwig) durch Carnivoren und Herbivoren (Wiederkauer).** [The digestibility and nutritive value of *Endomyces vernalis* Ludwig to carnivores and herbivores (ruminants).] Biochem. Zeitschr. 114: 111-128. 1921.—The writers found that the fatty fungus *Endomyces vernalis* could be digested and would serve as a nutriment to the dog and sheep. They found that from 58 to 85 per cent of the fat from the fungus was reabsorbed by the dog, while only 64 per cent of the protein was available to either animal.—*F. G. Gustafson*.

METABOLISM (NITROGEN RELATIONS)

3520. GORTNER, ROSS AIKEN, and EARL R. NORRIS. **The origin of the humin formed by the acid hydrolysis of proteins. 7. Hydrolysis in the presence of ketones.** Jour. Amer. Chem. Soc. 45: 550-554. 1923.

3521. JOHNSON, H. W., and C. B. LIPMAN. **The effect of reaction on the fixation of nitrogen by *Azotobacter*.** Univ. California Publ. Agric. Sci. 4: 397-405. 3 fig. 1922.—These are observations on the fixation of nitrogen by *A. chroococcum* grown in solutions of known reactions. The nitrogen fixed in the solutions of each reaction was determined and the changes in reaction during incubation were measured. It was found that the reaction of solutions below pH 8.0 changed very little, because no growth occurred below pH 6.0, and because the solutions in the region between 6.0 and 8.0 were highly buffered. The amount of nitrogen fixed was not greatly affected by reactions between pH values of 6.2 and 8.8, although reactions around pH 7.0 and 8.0 seemed to be most favorable. Slight changes outside of these values caused an abrupt decrease in fixation. The work shows that no nitrogen fixation by *Azotobacter* may be expected in many soils, since it has repeatedly been shown that pH values below 6.0 are frequently encountered.—*H. S. Reed*.

3522. JOHNSON, T. B., and E. B. BROWN. **The preparation of nucleic acid from the nucleoprotein of tubercle bacilli (tuberculinic acid).** Jour. Biol. Chem. 54: 721-730. 1922.—A nucleic acid has been obtained from tubercle bacilli (human and bovine), and the name tuberculinic acid has been given to it.—*G. B. Rigg*.

3523. JOHNSON, T. B., and E. B. BROWN. **The pyrimidines contained in tuberculinic acid, the nucleic acid of tubercle bacilli.** Jour. Biol. Chem. 54: 731-737. 1922.—Cytosine and thymine have been separated from this acid and identified.—*G. B. Rigg*.

3524. LEVENE, P. A. **Hydrolysis of yeast nucleic acid with dilute alkali at room temperature (Conditions of Steudel and Peiser).** Jour. Biol. Chem. 55: 9-13. 1923.—Former work by the author indicating that yeast nucleic acid is a tetranucleotide, in which the individual nucleotides are linked to one another in ester form, is confirmed.—*G. B. Rigg*.

3525. RUSS, V. K., und E. OESTERLIN. **Studien über die Phyto-Hämagglutinine. [Phytohaemoglutinine.]** Biochem. Zeitschr. 114: 258-276. 1921.—The results described in this

paper indicate that in soy beans, lentils, peas, and white beans there is a substance which agglutinizes the blood of man, dog, and guinea pig but not the blood of the horse, sheep, goat, rat, and mouse. This haemoglutinine was extracted with various concentrations of NaCl. It is only slightly thermolabile, can be precipitated by $(\text{NH}_4)_2\text{SO}_4$ and alcohol, cannot be extracted with ether together with oil, and is found only in the seeds.—*F. G. Gustafson*.

3526. SHOWALTER, M. F., and R. H. CARR. Characteristic proteins in high and low protein corn. *Jour. Amer. Chem. Soc.* **44**: 2019–2023. 1922.

3527. WOODMAN, HERBERT ERNEST. The chemistry of the strength of wheat flour. *Jour. Agric. Sci.* **12**: 231–243. 1922.—Previous work on the gliadin and glutenin of weak and strong flours pointed to the identical chemical nature of these compounds in the 2 types of flour, but more recent work has indicated that 2 proteins may be quantitatively identical with regard to their amino-acid content and yet be 2 distinct proteins, by virtue of differences in the order of linkage of the amino-acids within the protein molecule. The racemisation method recently used in the investigation of proteins of blood serum, colostrum, and milk was utilized to determine whether or not the proteins mentioned above are identical. This method depends on the behavior of proteins in dilute alkaline solution. Such solutions kept at 37°C. suffer a progressive diminution in the value of their optical rotatory power. If the specific rotations are plotted against the time in hours during which the reaction is allowed to proceed, then the readings fall on a perfectly smooth curve. Since individual proteins display specific behavior quantitatively when racemized with dilute soda, this method may be used to test the identity or non-identity of two compounds.—By the method described above and by (1) determining the identity of their specific rotations in 70 per cent alcohol, and (2) by determining the identity of their combining capacities for alkali, by titration, the gliadins of weak and strong flour are shown to be identical, while by the racemisation method their glutenins are shown to be 2 distinct substances. The results of this experiment indicate that strong wheat synthesizes one type of glutenin and weak wheat a different type, while wheats of intermediate strength may contain varying proportions of the 2 glutenins.—*V. H. Young*.

METABOLISM (ENZYMES, FERMENTATION)

3528. CONN, H. J. Fermentation and preservation of manure. (Abstract.) *Absts. Bact.* **6**: 484. 1922.

3529. CORRAN, J. W., and W. C. M. LEWIS. The effect of sucrose on the activities of the chloride and hydrogen ion. *Jour. Amer. Chem. Soc.* **44**: 1673–1765. 1922.

3530. DENNY, F. E. Methods for the estimation of small amounts of starch in plant tissues. *Jour. Assoc. Official Agric. Chem.* **6**: 175–191. 1922.—Of the 3 methods found to be most suitable, the absorbed-iodine method is the most convenient, as results are obtained by it in the shortest time. The reduction method (using the Scales modification) gave promise of being improved to give greater sensitiveness, since the range from 0 to 1 per cent can be split up into more distinct steps by means of it than by the others. The residual iodine method also exhibits possibilities. The methods described, applied to cantaloupe seed powders, cover a range of 0 to 1 per cent starch by steps of about 0.1 per cent. The principal method used consisted essentially in dissolving the starch in concentrated CaCl_2 solution, precipitating the starch under a standard set of conditions, titrating the iodine taken up by the starch, and comparing the values thus obtained with those given by known amounts of starch under the same conditions. Detailed descriptions of the methods are given together with results obtained by their use. The methods are recommended only for tissues containing small amounts of starch.—*F. M. Schertz*.

3531. EULER, H. V., I. LAURIN, und A. PETTERSON. Anpassung einer Oberhefe an das Gärsubstrat Galaktose. [Adaptation of top yeast to the substrate galactose.] *Biochem. Zeitschr.* **114**: 277–291. 1921.—The writers found that under normal conditions top yeast SB

II fermented cane sugar 50 times faster than galactose. The addition of a water extract of dried yeast increased the rate of galactose fermentation several fold. Seemingly the yeast extract served as an activator or co-enzyme to the zymase. By treating the yeast with a 2 per cent galactose solution for several days it was adapted to the galactose, and the rate of fermentation of the latter was increased 7 times, so that the ratio of galactose fermentation to that of cane sugar was 1:6.5 instead of 1:50.—*F. G. Gustafson.*

3532. FALK, K. G., and GRACE MCGUIRE. **Studies on enzyme action. XXI. Banana gel and banana sucrase.** Jour. Biol. Chem. 54: 655-669. 1922.—Results are reported on the relation between gel formation and sucrase content of extracts from banana pulp, obtained by means of solutions of NaCl and of other salts; also the sucrase content of the gel and of the solution, with the gel prepared by the action of pancreatin on banana pulp extract, and the separation of the gelsubstance and the sucrase substance by various treatments.—Gel formation decreased with increase in NaCl concentration in the extracting liquids. Solutions of NaCl and of other salts extracted more sucrase than did water alone. It is concluded, mainly on this basis, that the gel-forming property and the sucrase-forming property of the banana are due to different substances. Both properties are destroyed by boiling the solutions.—It is concluded that a definite enzyme property is not a soluble molecule or an insoluble molecule as such, but that the simplest chemical interpretation is that enzyme action is due to certain groupings present at one time with soluble and at another time with insoluble material.—*G. B. Rigg.*

3533. FENGER, FREDERIC. **A comparison between the chemical and physiological characteristics of pepsin and rennin.** Jour. Amer. Chem. Soc. 45: 249-255. 1923.—The properties of pepsin and rennin are different. Pepsin is coagulated by heat and is colloidal in nature. Rennin is a decomposition product of protein of the acid albumin type. It is not coagulated by boiling. "The former may be dialyzed, while the latter diffuses readily through parchment membranes." "Proteolytic or peptic activity does not seem to be a part of the true physiological characteristics of the milk-curdling enzyme."—*J. M. Brannon.*

3534. HAHN, A. **Über den Einfluss neutraler Alkalisalze auf diastatische Fermente. 4 Mitteilung.** [Influence of neutral salts on amylolytic enzymes. 4.] Zeitschr. Biol. 74: 217-228. 1922.—This is a summary of 3 previous papers [see Bot. Absts. 12, Entries 3535, 3536, 3537.] Certain new data are also given and the bearing of these results on the possible nature of enzymatic action is discussed. Ptyalin, diastase, and amylopsin can be precipitated at certain H-ion concentrations and can again be dissolved in HCl. Increasing or decreasing the H-ion concentration in reference to the precipitation optimum reduces the precipitation. The precipitation optimum for diastase in an acetate-tartaric acid solution is pH 3.63. All of the salts used have a protective effect against precipitation and accelerate activity in dilute concentrations of the buffers; at higher concentrations of the buffer the chlorides have the same effect, but the sulphates and nitrates have the opposite effect at H-ion concentration higher than the optimum. Sodium and potassium salts were tested. The optimum H-ion concentration for the action of ptyalin in phosphate and acetate buffer solutions is pH 6.4 and 5.6, respectively; for amylopsin pH 7.1 and 5.5, respectively; for diastase in acetate, pH 4.7. These results are comparable with the effect of certain salts and H-ion concentrations on colloids and seem to indicate that the effect of neutral salts on the activity of enzymes may be due to their action in decreasing, or increasing the total area of the colloidal enzyme solution.—*C. H. Arndt.*

3535. HAHN, A., und K. HARPUDE. **Über den Einfluss neutraler Alkalisalze auf diastatische Fermente. 1 Mitteilung.** [Influence of neutral salts on amylolytic enzymes. 1.] Zeitschr. Biol. 71: 287-301. 1920.—Data are given to show that salts may either inhibit, or accelerate, the activity of diastase and ptyalin. The particular effect is dependent upon the concentration and anion of the salt, the concentration and nature of the buffer, and the H-ion concentration of the solution.—*C. H. Arndt.*

3536. HAHN, A., und K. HARPUDER. Über den Einfluss neutraler Alkalisalze auf diastatische Fermente. 2 Mitteilung. [Influence of neutral salts on amylolytic enzymes. 2.] Zeitschr. Biol. 71: 302-310. 1920.—The authors were unable to find any evident relationship between the isoelectric point of the enzyme, as determined by its migration in an electric current, and its activity. The isoelectric point may lie either on the alkaline or the acid side of the optimum H-ion concentration.—C. H. Arndt.

3537. HAHN, A., und R. MICHALIK. Über den Einfluss neutraler Alkalisalze auf diastatische Fermente. 3 Mitteilung. [Influence of neutral salts on amylolytic enzymes. 3.] Zeitschr. Biol. 71: 10-18. 1921.—Neutral salts have the same effect on amylase as they had on ptyalin and diastase in the previously reported experiments. All 3 enzymes can be precipitated from solution at certain H-ion concentrations. The precipitation may be increased or decreased by the addition of the proper salt [see Bot. Absts. 12, Entry 3534.]—C. H. Arndt.

3538. HOWARD, J. W. The enzyme hydrolysis of benzyl succinate. Jour. Amer. Chem. Soc. 44: 1763-1765. 1922.

3539. NELSON, J. M., and DAVID I. HITCHCOCK. The activity of adsorbed invertase. Jour. Amer. Chem. Soc. 43: 1956-1961. 1921.

3540. SHERMAN, H. C., and MARY L. CALDWELL. Influence of amino acids in protecting amylase from inactivation by mercury. Jour. Amer. Chem. Soc. 44: 2923-2926. 1922.—The authors find that glycine and phenylalanine protect pancreatic amylase against small amounts of mercuric chloride.—J. M. Brannon.

3541. SHERMAN, H. C., and MARY L. CALDWELL. Influence of lysine upon the hydrolysis of starch by purified pancreatic amylase. Jour. Amer. Chem. Soc. 44: 2926-2930. 1922.—Lysine shows no effect upon the amylolytic action of pancreatic amylase, but exerts a favorable influence upon its saccharogenic action. Amylase, according to the authors' view, is protein in nature, and through hydrolysis it becomes inactivated. The presence of amino acids retards this hydrolysis. But lysine is not split off until after the amylolytic action has taken place and so does not exert its influence until after that stage.—J. M. Brannon.

3542. SHERMAN, H. C., and NELLIE M. NAYLOR. Influence of some organic compounds upon the hydrolysis of starch by salivary and pancreatic amylases. Jour. Amer. Chem. Soc. 44: 2957-2966. 1922.

3543. VOSBURGH, WARREN C. Some errors in the study of invertase action. Jour. Amer. Chem. Soc. 43: 1688-1693. 1921.—Invertase secretions are subject to loss in activity when diluted with distilled water. There is less loss when diluted with weak acids. Sucrose protects invertase from loss of activity. Sucrose is hydrolyzed by invertase faster when citrate buffer or acetate buffer is used as a source of the hydrogen ion than when either citric acid or acetic acid is used. Different invertase preparations vary in the magnitude of their losses on dilution.—J. M. Brannon.

3544. WALLACE, R. HEDGER. Vegetable rennet. Nature 110: 543. 1920.—A preliminary list of plants which have been used in place of rennet for the coagulation of milk is presented. The list includes: *Galium verum*, *Withania coagulans*, *Ficus Carica*, *Cynara cardunculus*, *Cynara scolymus*, *Carduus nutans*, *Cnicus benedictus*, *Drosera peltata*, *Datura Stramonium*, *Pisum sativum*, *Lupinus hirsutus*, *Ricinus hirsutus*, *Pinguicula vulgaris*, *Leucas cephalotes*, *Crotalaria Burhia*, *Rhazya stricta* and *Streblus asper*.—O. A. Stevens.

METABOLISM (RESPIRATION)

3545. PARKER, G. H. The calibration of the Osterhout respiratory apparatus for absolute quantities of carbon dioxide. Jour. Gen. Physiol. 4: 689-695. Fig. 1. 1922.—A method is given whereby minute absolute amounts of CO₂ may be measured by using the Osterhout

respiratory apparatus. Each particular apparatus must be calibrated since it has its own constant, but once this is done a formula, viz., $K = T \times W$, where K is the constant for the particular apparatus, T the time in seconds for change of indicator from one pH to another, and W the weight of CO_2 in hundred-thousandths mg. delivered per second. The expression may be stated thus, $\frac{K}{T} = W$.—O. L. Inman.

3546. PARKER, G. H. The excretion of CO_2 by relaxed and contracted sea anemones. Jour. Gen. Physiol. 5: 45-63. Fig. 1. 1922.—The metabolism of the sea anemone *Metridium marginatum*, as measured by the output of CO_2 in hundred-thousandths mg. per second by a gm. of living sea anemone showed that during the contracted state, the relaxed state, and the relaxing state, equivalent amounts of CO_2 were liberated, but that during the state of contraction there was an increase of CO_2 output, or increased metabolism. This has a direct bearing on the nature of the metabolic processes going on during a state of contraction, which state may be maintained for a long time in sea anemones and in some molluscs. A theoretical discussion of the relationship between tonus and tetanus is given.—O. L. Inman.

3547. RICHARDSON, A. C., and C. C. DOZLER. A safe method for securing anaerobiosis with hydrogen. IX. Jour. Infect. Diseases 31: 616-621. 1922.—A method whereby anaerobiosis with hydrogen is obtained with minimum risk to the operator is described in detail.—R. V. Allison.

3548. ROCKWELL, GEORGE E. The influence of carbon dioxide on the growth of bacteria. Jour. Infect. Diseases 32: 98-104. 1923.—It is pointed out that many, if not all obligatory aerobes are not obligatory, but may grow in the absence of oxygen provided the proper carbon dioxide tension is supplied. It is further noted that anaerobicity is concerned not only with the absence of oxygen but with the presence of carbon dioxide in practically all cases. Interesting studies are also presented upon partial tension strains and particularly the relation of the concentration of these 2 gases in the case of those cultures recently isolated from the host.—R. V. Allison.

3549. WOODMAN, HERBERT ERNEST. Comparative determinations of the digestibility and metabolisable energy of green oats and tares, oat and tare hay and oat and tare silage. Jour. Agric. Sci. 12: 144-165. 1922.—Tables of physiological interest are given.—V. H. Young.

ORGANISM AS A WHOLE

3550. DUFRÉNOY, J., et R. MOLINÉRY. Les sulfuraires. [Sulphur bacteria.] Presse thermale et climatique 63: 478-480. Fig. 1. 1922.—In the thermal springs of the Pyrenees (Barèges and Luchon) microscopic sulphur crystals form in the layer of sulphur bacteria floating on the water, while sulphur granules form inside the cells of *Thiothrix*. Sulphur formation is most active at temperatures of 40-50°C.—J. Dufrénoy.

3551. FARR, CLIFFORD H. The psychology of plants. Atlantic Monthly 130: 775-783. 1922.

3552. GREIG-SMITH, R. The high temperature organism of fermenting tan-bark. Proc. Linn. Soc. New South Wales 46: 76-98. 4 figs. 1921.—The fermentation of spent wattle-bark in the corrosion of white lead by the old Dutch process was caused by a stout rod-shaped bacterium having a terminal spore. Its optimum laboratory temperature was 60°C., although in the corroding stacks the temperature might rise to 80°. Raw spent wattle-bark was difficult to ferment and required preliminary treatment or "tempering," that is, the maintenance of a vigorous growth of active bacteria. As conditions which oxidise tannin substances favor fermentation of the raw bark, it is probable that residual tannins inhibit fermentation. During the corrosion process there was a comparatively slow and prolonged evolution of CO_2 , due mainly to bacteriological fermentation, the speed of which seemed to be regulated by

small amounts of nitrogenous matter in the bark. This conclusion was confirmed by experiments showing the influence of asparagin. The organism was found to be capable of decomposing sugar, such as dextrose or saccharose, when freshly isolated, but soon thereafter it required the addition of alkali to enable it to act. The spores were difficult to destroy, especially when in the pores of the bark; they lived after exposure to 186–205° for 2½ hours. It was not proved that the bacteria could ferment cellulose. There was no growth of the organism in media devoid of soluble sources of carbon, such as Uschinsky's solution. The constituent of the bark fermented is still unknown.—*Eloise Gerry.*

3553. HARLAN, HARRY V., and MERRITT N. POPE. The germination of barley seeds harvested at different stages of growth. *Jour. Heredity* 13: 72–74. 1 fig. 1922.—Barley kernels at Aberdeen normally mature about 26 days after flowering. The diastase which digests the starch endosperm is secreted by the epithelial layer of the scutellum. This layer assumes its form about the 14th day after flowering. Hand pollinated kernels germinated 5 days after flowering, when the entire kernel contained only 5 mgm. of dry matter. The mature kernel contains about 35 mgm. dry matter. All seeds that germinated produced normal plants.—*H. V. Harlan.*

3554. HEARN, GEO. D. Relation of sunlight to plant development. [Rev. of: GARNER, W. W., and H. A. ALLARD. Effect of the relative length of day and night and other factors of the environment on growth and reproduction in plants. *Jour. Agr. Res.* 18: 553–606. 1920 (see Bot. Absts. 5, Entry 22).] *Monthly Weather Rev.* 50: 423–424. 1922.

3555. KÜSTER, E. Botanische Betrachtungen über Alter und Tod. [Botanical observations on senescence and death.] *Abhandl. Theoret. Biol.* [Edited by JULIUS SCHAXEL.] 10: 1–44. 1921.—This paper represents some conclusions that are based on the observations of various authors from Pliny to the present time as to the facts of senescence and death in plants. The paper serves as an introduction to the many aspects of the literature, especially the more recent publications.—*C. C. Epling.*

3556. LOPEZ Y NEGRIN, J. Die Anaphylaxie. Authorized translation by C. RICHET *iv* + 221 p. Akademische Verlagsgesellschaft m. b. H.: Leipzig, 1920.

3557. MEGRAIL, EMERSON. Factors influencing development of metachromatic granules in the diphtheria bacillus. *Jour. Infect. Diseases* 31: 393–401. 1922.—Granule production in the diphtheria bacillus shows marks variation in response to the different media used. The influence of single versus confluent colonies as the source of smears as well as the effect of products of growth upon old as compared to young cultures were considered. The influence of temperature, water content of the substratum, oxygen pressure, and the presence of diphtheria toxin and toxin-antitoxin are also discussed.—*R. V. Allison.*

3558. REXHAUSEN, LUDWIG. Über die Bedeutung der ektotrophen Mykorrhiza für die höheren Pflanzen. [On the importance of ectotrophic mycorrhiza for higher plants.] *Beiträge Biol. Pflanzen* 14: 18–59. Pl. I–III, fig. 1–4. 1920.—By the use of microchemical tests and cultural studies with the mycorrhiza of *Picea* the writer sought to determine whether the ectotrophic mycorrhiza are parasitic or symbiotic in nature. He found that under certain conditions of culture the mycorrhiza fungi may be parasitic while under other conditions they may supply the roots with phosphorus and potassium as well as perhaps nitrogen and so may properly be regarded as beneficial to the host plant to a degree at least. The protective devices developed (tannin, certain wall thickenings) by the host against invasion by the fungus are considered. Text figures show the distribution of various chemicals in the roots under different conditions of culture. In his studies of the relation of *Monotropa* to the host fungus he finds that the fungus, by means of haustoria, does take certain substances (proteins and perhaps sugar) from the epidermis of the host. On the other hand, he is convinced, though no certain proof is available, that the epidermal cells do absorb the contents of dying hyphae

of the fungus.—Germination experiments with seeds of *Monotropa* have not been successful because of the necessity of the presence of the proper fungus and the difficulty of eliminating from the cultures other fungi which suppress the activity of the true fungus.—Orton L. Clark.

3559. TANNER, FRED W. **Microbiology of flax retting.** Bot. Gaz. 74: 174-185. 1922.—*Clostridium amylobacter* was isolated as the specific organism of retting flax. It is an anaerobic, spore-forming bacterium commonly present on flax stalks and widely distributed in nature. It hydrolyzes rapidly the carbohydrate "binders" in the flax stalk. The time interval was no less, and the action no more effective when the anaerobic *Clostridium* was associated with aerobic forms. Temperature is an important factor, the optimum being about 30°C. Shortening of the retting process and a better quality of fiber are produced by utilizing controlled conditions with an optimum environment. "Previous sterilization of the flax did not seem to affect the retting process. No real success was secured by the use of 15 common aerobic bacteria and 5 yeast-like fungi. Flax raised from seed was quickly retted, although the fiber was not in as good condition as that prepared from flax raised for fiber."—B. W. Wells.

3560. WILSON, J. K. **The growth of soil bacteria in guttation water.** (Abstract.) Absts. Bact. 6: 484. 1922.—*Bacillus cereus*, *B. fluorescens*, *B. radiciola* and 2 unnamed species grew abundantly in sterilized guttation water.—D. Reddick.

GROWTH, DEVELOPMENT

3561. MASON, T. G. **Growth and abscission in sea island cotton.** Ann. Bot. 36: 457-484. 10 fig. 1922.—The factors responsible for the premature shedding of flower buds and bolls were studied. It is shown that the susceptibility to shedding is very small until growth in the main axis has nearly ceased. It is concluded that both cessation of growth and increased susceptibility to shedding are due to the diversion of food to the large number of more mature bolls on the lower part of the plant. This conclusion is supported by the fact that the removal of the more mature bolls lessens the shedding. In general it is believed that the amount of shedding is determined by the rate at which food is manufactured and by the rate at which it is used up, and that consequently any factor which causes a decrease in food manufacture causes an increase in shedding. In agreement with this it was found that shedding increased after the removal of leaves, daytime rain, lack of direct sunlight, etc.—W. P. Thompson.

3562. PRIESTLY, J. H., and W. H. PEARSALL. **Growth studies, III. A "volumometer" method of measuring the growth of roots.** Ann. Bot. 36: 485-489. 1 fig. 1922.—An account is given of an apparatus which is designed to measure the whole root system of a plant at intervals during an extended period. The roots are grown in a container to which the nutrient solution is admitted and from which it is removed through a tap at the bottom. Changes in volume of solution in successive readings give the increases in volume of the root system. There are many devices to secure accuracy and convenience in use.—W. P. Thompson.

TEMPERATURE RELATIONS

3563. ESTY, J. RUSSELL. **The heat resistance of *B. botulinus* spores.** Amer. Jour. Public Health 13: 108-113. 1923.—The heat resistance of spores of 112 strains of *B. botulinus* from various sources, including 31 Type A, 30 Type B, and 1 non-toxic, varies from 3 to 75 minutes at 105°C. In general, spores of Type A are more resistant than those of Type B. The maximum heat resistance of spores produced under optimum conditions of growth is 330 minutes at 100°C; 110 at 105°C; 33 at 110°C; 11 at 115°C; and 4 at 120°C. when heated in a phosphate solution of pH 7.0. These figures represent the shortest time at which no spores survived. The longest survival times under the same conditions mentioned above are 320, 100, 30, 10, and 4 minutes respectively. The resistance of different strains varies irrespective of the numbers of spores produced in the same medium; but the resistance of a given strain is markedly influenced by the number of spores heated, the larger the number in a suspension the greater the resistance.—C. A. Ludwig.

3564. ESTY, J. R., and K. F. MEYER. The heat resistance of the spores of *B. botulinus* and allied anaerobes. Jour. Infect. Diseases 31: 650-663. 1922.—The specific resistance to heat of the spores of a large number of strains from each of several different varieties of anaerobes was determined under varying conditions. It is thought that young spores, probably those of the first generation, are the most resistant to heat. Among other important observations it was noted that increasing the concentration of the solution up to a certain limit or, under other conditions, the dryness of the spores tended to increase the resistance to heat. Likewise, the thermal resistance of *B. botulinus* was found to be affected by the H-ion concentration of the solutions.—R. V. Allison.

3565. HUBERT, ERNEST E. A simple apparatus for controlling temperatures. Bot. Gaz. 74: 333-334. Fig. 1. 1922.—This electrically operated apparatus may be connected with an ordinary lighting circuit. Its main advantage according to the author "lies in the fact that the same current which passes through the heating units is used, after reducing the voltage to 6, 8 or 14 volts, to operate the relay." It is sensitive to within $\frac{1}{4}$ degree.—B. W. Wells.

3566. JOHNSTON, EARL S. Moisture content of peach buds in relation to temperature evaluations. Bot. Gaz. 74: 314-319. Fig. 1-2. 1922.—For 3 years from Jan. to March, data were obtained as follows: Ratio of water content to dry weight of buds; temperature indices summed from Jan. 1. The author presents graphs which bring out the definite relationship between air temperature and the rate of increase in the moisture content of peach fruit buds. The slope of the curve for 1 year was quite different from those of the other 2. The writer suggests that "some conditioning influences are at work before Jan. 1 that determine the slopes of these curves."—B. W. Wells.

3567. NEWTON, ROBERT. A comparative study of winter wheat varieties with special reference to winter-killing. Jour. Agric. Sci. 12: 1-19. Tables I-VI. 1922.—After reviewing work on the injury to plants from freezing and on the internal factors making for hardiness in plants, the author describes methods of work and results in an attempt to establish a chemical or physico-chemical measurement for winter wheat varieties. Studies were made of the physical constants of the cell sap and the content of dry matter, nitrogen, sugars, and starch. No constant relation was found between depression of the freezing point, specific conductivity, or H-ion concentration of the cell sap and relative frost hardiness. An attempt was made to differentiate between osmotic pressure due to electrolytes and that due to sugars. The latter accounted for 34 to 38 per cent of the total osmotic pressure of the sap. The ratio of that part of the osmotic pressure not due to sugars (designated P-Ps) to the corrected specific conductivity ($\times 10^3$) is not a constant, for this ratio varied from 0.96 to 1.07 in samples collected early in November and varied from 0.73 to 0.91 in samples collected December 9. The relation between dry matter and hardiness was not constant though 1 of the 2 tender varieties had the lowest percentage. All varieties increased in amino nitrogen and water-soluble nitrogen during the hardening process. The hardest variety had the largest content of water-soluble nitrogen, but the relation was not uniform throughout the series. The amount of sugar present did not correspond uniformly with the known hardiness and decreased from Nov. to Dec., the greatest decrease being in one of the two tender varieties. Sucrose is important as a storage product and is apparently the only disaccharid present. No starch was present in any of the varieties. The colloidal complex of fully hardened tissue was very resistant to freezing and could not be broken down by a freezing mixture with a theoretical temperature of -59.9°C . Such hardened tissues retain their water with great force. No appreciable amount of sap could be extracted under a pressure of 400 atmospheres though the tissues contained 70 per cent of moisture and were subjected to severe preliminary freezing.—V. H. Young.

TOXIC ACTION

3568. ATWOOD, W. M. Physiological studies of the effects of formaldehyde on wheat. Bot. Gaz. 74: 233-263. Fig. 1-12. 1922.—Formaldehyde slowly penetrates the seed coat. Within the germinating seed it reduces the diastatic activity, inhibits the function of the

catalases, and lessens respiration. The author suggests that "it is entirely possible that concentrations which do not materially injure germination percentages do materially disturb the physiological processes related to germination and subsequent growth." Regarding concentration, he indicates that the common 1-320 formula may be injurious through reduction of seedling vitality in the presence of germination. [See also Bot. Absts. 9, Entry 1044.]—*B. W. Wells.*

3569. OLDENBUSCH, CARRIE. Stimulation of plants by carbon disulphide. Bull. Torrey Bot. Club 49: 375-389. 1922.—Studies made on seeds and seedlings, on buds and certain fungi, showed the ability of carbon disulphide to stimulate when used in dilute amounts. Such was the case in dormant protoplasm of twigs, which quickly resumed growth; in active protoplasm of twigs, which quickly resumed growth; in active protoplasm of seedlings, which elongated more rapidly; and in conidia which germinated sooner and elongated more rapidly. This acceleration lasts for only a certain period and growth then tends to return to normal.—*P. A. Munz.*

3570. WILLIAMS, MAUD. On the influence of immersion in certain electrolytes upon cells of *Saxifraga umbrosa*. Ann. Bot. 36: 569-578. 3 fig. 1922.—The author uses the precipitation of the tannin within the cells by means of potassium dichromate as a criterion of the toxicity of electrolytes. This reaction can occur only after the tissue has been immersed in a given concentration of salt solution for a definite length of time. Beside potassium dichromate 6 salts are used: the chlorides, iodides, and nitrates of sodium and potassium. In her curves, the author plots $\log T$ against $\log C + 1$, where T is the "critical time" and C is concentration, and obtains straight lines. The equation here is: $\log T + k (\log C + 1) = K$. According to the results, different "monovalent cations and similar anions produce different effects while marked differences occur if the cation be kept constant and the anion varied, so that simple chemical action does not seem to explain the changes produced." The author therefore regards the results as due to adsorption and the precipitation of colloids.—*S. F. Cook.*

MISCELLANEOUS

3571. GREIG SMITH, R. Note upon the extraction of acids from cultures. Proc. Linn. Soc. New South Wales 46: 154-156. 1921.—The extraction of the fixed acids from bacterial or from yeast cultures is of the nature of a monomolecular reaction and should be continued until no more acid is extracted. The preparation of salts, such as those of barium, by neutralising the extracted acids until a pink color is obtained in the presence of phenolphthalein, may be faulty as the reaction is much slower than is generally supposed.—*Eloise Gerry.*

3572. LEWIS, J. M. The estimation of acidity. Proc. Roy. Soc. Victoria 33: 233-260. 11 fig. 1921.—The use of the electrometric method is discussed in detail.—*Eloise Gerry.*

3573. MINOT, A. S. Lead studies. II. A critical note on the electrolytic determination of lead in biological material. Jour. Biol. Chem. 55: 1-8. 1923.

SOIL SCIENCE

A. G. McCALL, *Editor*

(See also in this issue Entries 2901, 2904, 2905, 2914, 2923, 2932, 2933, 2934, 2937, 2939, 2940, 2945, 2948, 2950, 2953, 2958, 2959, 2960, 2974, 3003, 3004, 3040, 3071, 3521)

3574. BORLASE, W., and ALEXANDER GREGG. The agricultural value of sea-sand. Jour. Ministry Agric. Great Britain 29: 591-599. 1922.—The dune and beach sands of Cornwall contain much calcium carbonate from the shells of the several species of mollusks abundant

on that coast. For centuries the Cornish farmers have carried the sand inland, and it is today in strong competition with burnt lime and ground limestone as a source of lime. Analysis of sands from 34 localities shows 22-950 pounds of CaO per ton, 19 of the samples analyzing more than 25 per cent CaO. There was no correlation between fineness and lime content. Experiments by the Cornwall County Council and the experience of individual farmers have demonstrated that these sands are at least as beneficial as commercial forms of lime to clover and grass, although like other forms of lime they may be deleterious to oats and mangolds. Since the soils of Cornwall are generally acid and purchased lime must be brought from South Devon or Somerset, the deposits of sea-sand are of great importance. An examination of the immense quantities of blown sand found elsewhere along the English coast is suggested.—*L. W. Kephart.*

3575. BOVING, P. A. Soil microbiology—A résumé and an appeal. *Sci. Agric.* 3: 75-78. 1922.—The writer discusses microorganisms and their relation to soil fertility.—*T. G. Major.*

3576. BROWN, H. D., and F. A. DALLYN. Report on the fertilizer value of activated sludge. *Ann. Rept. Provincial Bd. Health, Ontario, Canada.* 39: 130-155. 1920.—The activated sludge process, developed in the past 5 years, is the most promising method of converting urban sewage into a usable nitrogenous fertilizer. It is estimated 1,000 pounds of sludge can be recovered per million gallons of sewage and that approximately 15.4 per cent of the total available nitrogen in the sewage may be recovered as fertilizer base. From data on world production and costs of synthetic and non-synthetic ammoniates and from the known limitations of the former, it is concluded that there is a large prospective market for this material.—In the experimental work activated sludge was prepared by oxidizing the organic material of the raw sewage under aeration with a sludge culture, allowing the liquid to settle and drying and grinding the precipitate. A grayish powdery substance resulted which was quite inoffensive in odor and containing 4.5 per cent nitrogen. It was compared in fertilizing value with cyanamide, dried blood, sodium nitrate, ammonium sulphate, and tankage. Three series of plots were used receiving respectively 40, 80, and 120 pounds of nitrogen per acre in each of the above 6 forms, and 200 pounds each of superphosphates and potassium chloride. The indices used were flax, potatoes, peas, beans, tomatoes, cauliflower, cabbage, carrots, seed onions, lettuce, and tobacco. The results indicate that (1) the nitrogen in activated or dried sludge is readily available and assimilable; (2) the sludge is very beneficial when applied immediately prior to planting; (3) the sludge gives a rapid early growth which exceeds that of any commercial fertilizer used; and (4) the maturity of the plant is hastened.—Preliminary investigations indicate that the nitrogen content of the sludge can be considerably increased by more rapid and thorough drying and by introducing pure cultures of *Azotobacter* and nitrifying bacteria during activation.—*L. W. Kephart.*

3577. DESCH, C. H. The nitrogen industry. *Nature* 110: 670-671. 1922.—This is a summary of several addresses at the Hull meeting of the British Association, dealing with commercial fixation.—*O. A. Stevens.*

3578. MUKHERJEE, J. N. Experiments on the theory of soil acidity. *Nature* 110: 732. 1922.—Soil acidity is conceived to be due to the adsorption by soil gels (e. g. silica) of the anions, leaving the cations in a mobile second layer. The latter may be removed, in part, by replacement with a neutral salt. Silica was found to adsorb considerable quantities of acids. Aqueous extracts were neutral, but on shaking with KCl solution an acid extract was obtained. Simultaneous experiments on electro-osmosis demonstrated that the acids are not adsorbed as molecules, but as ions.—*Frank Thone.*

3579. POPE, HAROLD B. Nauru and Ocean Island. Their phosphate deposits and workings. *Jour. Dept. Agric. Victoria* 19: 450-469. 12 fig., 3 maps. 1921.—The bird theory regarding the origin of the deposits on these islands is generally accepted. The quality of the phosphate is particularly high, the average tribasic phosphate of lime content being from 58

per cent to 88 per cent. An account of the discovery and the mining operations is given. [See also Bot. Absts. 12, Entry 874.]-Wm. E. Lawrence.

3580. WEISKE, F. *Die Wertverluste des Kalkstickstoffs beim Lagern*. [Loss in value of calcium nitrate in storage.] *Landw. Jahrb.* 54: 601-618. 1920.—The author reviews the literature and reports on a series of experiments on the loss in weight and in nitrogen as well as in the formation of dicyanamid-nitrogen in calcium nitrate. Vegetation experiments were carried on with white mustard. The results confirmed the conclusion drawn from previous experiments, that the formation of any considerable quantity of dicyanamid in the calcium nitrate materially reduces its value as a fertilizer.—A. J. Pieters.

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*

E. B. PAYSON, *Assistant Editor*

(See also in this issue Entries 2962, 2992, 3012, 3019, 3020, 3027, 3034, 3035, 3036, 3115, 3144, 3147, 3149, 3230, 3274, 3319, 3364)

GENERAL

3581. MEZ, CARL, und KARL KIRSTEIN. *Sero-diagnostische Untersuchungen über die Gruppe der Gymnospermae*. [Sero-diagnostic studies on the groups of Gymnosperms.] *Beiträge Biol. Pflanzen* 14: 145-148. 1920.—The use of serums in testing out the protein relations of various groups of the gymnosperms led to the following results: Positive reactions were obtained between the Abietineae with *Selaginella* and *Magnolia*. The position of *Ginkgo* as a primitive member of gymnosperms is not borne out by the serum test. No reaction was found between *Ginkgo* and *Cycas*. One evolutionary series according to the authors is from Hepaticae to Lycopodiales eligulatae to Lycopodiales ligulatae to Coniferae to Ranales. Another series follows from Hepaticae to Filicales eusporangiatæ to Cycadofilicales to Cycadales to Bennettitales. A relationship between the protein of Gnetales and Coniferae was found. No reaction occurred between any of the Coniferae with Amentales and allied forms of Casuarinaceae, Fagaceae, Juglandaceae, Piperaceae, which confirms earlier results placing the Amentales in the series Ranales, Centrospermae, Myricales, Amentales. From the protein relationship certain morphological conclusions follow such as the homology of the ovuliferous scale of Abietineae and the ligula of Lycopodiales ligulatae.—Orton L. Clark.

3582. NORDHAGEN, ROLF. *De nøkenfrøedes stilling i plantesystemet*. [The position of the Gymnospermae in the plant system.] *Naturen* 46: 261-281. *Fig.* 1-8. 1922.

3583. PAU, C. *El herbario de Planellas (Continuação)*. [Planellas' herbarium (cont.).] *Broteria Sér. Bot.* 20: 120-129. 1922.—The 3rd article of the series. The discussion covers species of the families Circeaceae to Dipsaceae with notes upon many of them. [See Bot. Absts. 10, Entry 2006; 11, Entry 1599.]-E. B. Chamberlain.

SPERMATOPHYTES

3584. BERGER, ALWIN. *Beiträge zur Flora von Afrika. XLIX. Mehrere neue Mesembrianthemum und eine Aloe*. [Contributions to the Flora of Africa XLIX. Several new Mesembrianthemums and one Aloe.] *Bot. Jahrb.* 57: 626-640. 1922.—Owing to a lack of living material and to other difficulties the author is discontinuing his monograph of the genus and is publishing only certain new species chiefly from the former German colony in southwest Africa. The species and names proposed as new are: *Mesembrianthemum olivaceum* Schl. & Berg., *M. nodosum*, *M. annulatum*, *M. diversipapillosum*, *M. leptarthron*, *M. subnodosum*, *M. acutisepalum*, *M. melanospermum*, *M. mentiense*, *M. glareosum*, *M. clavulatum*, *M. solutifolium*, *M. commutatum* (*M. longispinulum* Salm), *M. trichosanctum*, *M. Cronemeyerianum*, *M. Brunnthaleri*, *M. pungens*, *M. Maximiliani* Schl. & Berg., *M. perspicuum*, *M. vallisgratiae* Schl. &

Berg., *M. macrocarpum*, *M. Dyckii* (*M. conspicuum* Salm), *M. polypetalum* Schl. & Berg., *M. tenuicaule*, *M. nudicaule*, *M. Rustii*, *M. Schneiderianum*, *M. drepanophyllum* Schl. & Berg., *M. apricum*, *M. tulbaghense*, *M. lunulatum*, *M. abruptum*, *M. oxysepalum* Schl. & Berg., *M. Dielsianum*, and *Aloe linearifolia*.—K. M. Wiegand.

3585. BRANDEGEE, TOWSHEND STITH. *Plantae Mexicanae Purpusianae*, XI. Univ. California Publ. Bot. 10: 181-188. 1 fig. 1922.—The following new species are proposed and described: *Tradescantia heterophylla*, *Gomphrena crassicaulis*, *Lonchocarpus dumetorum*, *Pithecolobium leucospermum*, *Mimosa chaetocarpa*, *Calliandra mexicana*, *C. scopulina*, *Bauhinia* (*Casparia*) *peninsularis*, *Desmodium sylvicola*, *Parosela longeracemosa*, *Hiraea Purpusii*, *Croton sitiens*, *Miconia Purpusii*, *Oenothera thalassaphila*, *Gunnera mexicana*, *Cordia ovata*, *Physalis filipendula*, *Stemmadenia calycina*, *Roseanthus heterophyllus*, *Apodanthera scaberrima*; and the description of the fruit of *Pachystelma cordatum* Brandg. is added.—W. A. Setchell.

3586. CAMUS, A. *Les Andropogonées odorantes des régions tropicales*. [Odoriferous *Andropogoneae* of tropical regions.] Rev. Bot. Appl. 1: 270-306. 1921.—Three genera of this tribe yield essential oils, viz., *Cymbopogon*, *Vetiveria*, and *Amphilophis*. The author describes 40 species of *Cymbopogon*, giving a number of references to synonymy, native names, the principal botanical characters, and brief notes on the economics of particular species. An artificial key precedes the enumeration of species. Under *Vetiveria* one species, *V. zizanioides* Nash, is described and discussed at length; and 4 species of *Amphilophis* are recognized. The following new combinations are included: *Cymbopogon refractus* (*Andropogon refractus* R. Br.), *C. microthecus* (*A. microthecus* Hook. f.), *C. hamulatus* (*A. hamulatus* Nees), *C. rectus* (*A. rectus* Steud.), *C. Goeringii* (*A. Nardus* subsp. *marginatus* var. *Goeringii* Hackel), *C. procerus* (*A. procerus* R. Br.), *C. exaltatus* (*A. exaltatus* R. Br.), *C. ambiguus* (*A. ambiguus* Steud.), *C. bombycinus* (*A. bombycinus* R. Br.), *Amphilophis odorata* (*Andropogon odoratus* Lisboa), and *A. Woodrovii* (*Andropogon Woodrovii* Hook. f.).—Paul Russell.

3587. DANSER, B. H. *Contribution à la systématique du Polygonum lapathifolium*. [Contribution to the systematics of *Polygonum lapathifolium*.] Recueil Trav. Bot. Néerland. 18: 125-210. 3 pl. 1921.—The author records the results of an extended study of *Polygonum lapathifolium* Pers. which he regards as a collective species and for it proposes several subspecies and varieties. The various forms recognized are characterized and discussed in detail.—J. M. Greenman.

3588. ENGLER, A. *Beiträge zur Flora von Afrika*. XLIX. *Scrophulariaceae africanae*. [Contributions to the Flora of Africa XLIX. African *Scrophulariaceae*.] Bot. Jahrb. 57: 609-614. 1922.—The author describes a new genus, *Freyliniopsis*, and 11 new species as follows: *Freyliniopsis Trothae*, *Torenia Dinklagei*, *Phyllopodium Rangei*, *Craterostigma ndassekerense*, *C. kundalungense*, *Alectra Stolzii*, *A. Ledermannii*, *A. moeroensis*, *A. angustifolia*, *A. scharensis*, and *A. Merkeri*.—K. M. Wiegand.

3589. GAGE, A. T. *Euphorbiaceae novae e Peninsula Malayana*. [New *Euphorbiaceae* from the Malay Peninsula.] Rec. Bot. Surv. India 9: 219-249. 1922.—The following new species and combinations appear: *Actephila ovalis* (*Dimorphocalyx ovalis* Ridl.), *Phyllanthodendron dubium* (*Cleistanthus dubius* Ridl.), *Glochidion Kunstlerianum*, *G. Maingayi*, *G. singaporense*, *G. tetrapteron*, *Sauropus Llanosi* (*Glochidion Llanosi* Muell. Arg.), *Drypetes perakensis*, *Antidesma stenophyllum* (non Merrill), *A. Kunstleri*, *A. cruciforme*, *A. gracillimum*, *Aporosa Prainiana* King, *A. symplocoides* (*Baccaurea symplocoides* Hook. f.), *A. confusa*, *Baccaurea Kunstleri* King, *B. Kingii*, *B. Hookeri*, *B. pyriformis*, *Galearia minor*, *G. Ridleyi*, *Croton lucidum*, *C. confusum*, *Acalypha siamensis* Oliv., *Coelopedas subcordatus*, *Coelodiscus subcuneatus*, *Mallotus brevipetiolatus*, *M. similaciformis*, *Blumeodendron vernicosum* (*Mallotus vernicosus* Hook. f.), *B. concolor*, *Macaranga setosa*, *M. incisa*, *M. puncticulata*, *M. recurvata*, and *Ptychopyxis angustifolia*.—E. D. Merrill.

3590. HIERN, W. P. On a new species and a new variety of *Diospyros*. Proc. Linn. Soc. New South Wales 46: 211-212. 1921.—*Diospyros austrocaledonica* n. sp. and *D. samöensis* A. Gray var. *ovata* n. var. are described.—*Eloise Gerry*.

3591. JEPSON, WILLIS L. A new species of cypress. Madroño 1: 75. 1922.—*Cupressus Forbesii*, from San Diego County, California, is described as new.—*Roxana Stinchfield Ferris*.

3592. JOHNSTON, IVAN MURRAY. Undescribed plants mostly from Baja, California. Univ. California Publ. Bot. 7: 437-446. 1922.—The following new species, varieties, and combinations are proposed: *Ephedra peninsularis*, *Stenophyllus nesioticus*, *S. Sellowiana* (*Isolepis Sellowiana* Kunth), *Viscainoa geniculata* Greene var. *pinnata*, *Condalia Parryi* Web. var. *microphylla*, *Euphorbia dentosa*, *E. peninsularis*, *E. podagrica*, *Securinea capensis*, *S. fasciculata* (*Bernardia fasciculata* Wats.), *S. Hallii* (*Tetracoccus Hallii* Brandg.), *Mentzelia hirsutissima* Wats. var. *nesiotes*, *M. hirsutissima* Wats. var. *stenophylla* (*M. stenophylla* Urb. & Gilg.), *M. involucrata* Wats. var. *megalantha*, *M. tricuspidis* Gray var. *brevicornuta*, *Cryptantha inaequata*, *C. maritima* Greene var. *pilosa*, *C. racemosa* Greene var. *lignosa*, and *Houstonia australis*.—*W. A. Setchell*.

3593. MERRILL, E. D. Diagnoses of Hainan plants. Philippine Jour. Sci. 21: 337-355. 1922.—Thirty-seven new species of flowering plants are described; these are: *Rhaphidophora Maclurei*, *Disporum hainanense*, *Alpinia Maclurei*, *Piper Maclurei*, *Castanopsis hainanensis*, *Ficus palmatiloba*, *Debregeasia spiculifera*, *Aristolochia hainanensis*, *Fissistigma Maclurei*, *Machilus hainanensis*, *Phoebe hainanensis*, *Cryptocarya hainanensis*, *C. Maclurei*, *C. obtusifolia*, *Rhaphiolepis parvibracteolata*, *Bauhinia Moningeriae*, *Evodia hainanensis*, *Breynia rostrata*, *Antidesma hainanense*, *Mallotus Maclurei*, *Gomphandra hainanensis*, *Gonocaryum Maclurei*, *Meliosma angustifolia*, *Rhamnella hainanensis*, *Adenia Maclurei*, *Eugenia Maclurei*, *Rhododendron hainanense*, *Ardisia Maclurei*, *Sideroxylon rostratum*, *Diospyros cardiophylla*, *Wrightia hainanensis*, *Erycibe hainanensis*, *Radermachera hainanensis*, *Oreocharis flavida*, *Strobilanthes Maclurei*, *Lasianthus hainanensis*, and *Gynura Maclurei*. The study of recently collected material brings the list of Hainan species from about 350 previously known to somewhat over 1000.—*E. D. Merrill*.

3594. MERRILL, E. D. Notes on the flora of southeastern China. Philippine Jour. Sci. 21: 491-513. Fig. 1. 1922.—This paper is based largely on material from Kwangtung Province. It consists of records of species new to the province, with descriptions of 18 new species as follows: *Fokienia Maclurei*, *Polychroa Tsoongii*, *Loranthus Maclurei*, *Euchresta trifoliolata*, *Atalantia kwangtungensis*, *Chisochilton chinensis*, *Trigonostemon chinensis*, *Koelreuteria integrifolia*, *Elaeocarpus glabripetalus*, *Eurya stenophylla*, *Shorea chinensis*, *Eugenia Tsoongii*, *Ligustrum Tsoongii*, *Tabernaemontana chinensis*, *Botryopleuron longispicatum*, *Thunbergia chinensis*, *Hedyotis platystipula*, and *Pentaphragma spicatum*. *Ichnocarpus volubilis* (Lour.) Merr. is adopted as the oldest name for *I. ovatifolius* A. DC.—*E. D. Merrill*.

3595. MERRILL, E. D. Additions to our knowledge of the Bornean flora. Philippine Jour. Sci. 21: 515-534. 1922.—Seven previously described species are for the first time recorded from Borneo and the following 19 are described as new: *Pothos mirabilis*, *Quercus borneensis*, *Ficus inaequipetiolata*, *Orophea myriantha*, *Lunasia gigantifolia*, *Chisocheton polyandrus*, *Aporosa grandistipula*, *Cyclostemon Castilloi*, *Zizyphus lenticellata*, *Sterculia acuminatissima*, *S. Hosei*, *S. longipetiolata*, *S. membranacea*, *S. Yatesi*, *Saurauia Agamae*, *Rinorea Castilloi*, *Tabernaemontana polysperma*, *Premna glandulosa*, and *Psychotria Agamae*.—*E. D. Merrill*.

3596. PAYSON, EDWIN BLAKE. Species of *Sisymbrium* native to America north of Mexico. Univ. Wyoming Publ. Bot. 1: 1-27. 1922.—The usual interpretation of the generic name *Sisymbrium* is accepted in the present paper and the application of this name to the water-cross, as has been made by certain American authors, is not approved. *Sisymbrium altissimum* L. is regarded as the generic type. The following general conclusions in regard to the

phylogeny of the species of *Sisymbrium* have been reached by a consideration of the American species: (1) An annual or biennial habit of growth is more primitive than the perennial habit; (2) a stipe or gynophore that raises the ovary above the torus is a primitive character; (3) a long, terete pod is more primitive than a short or compressed one; (4) in the primitive species the petals were probably purplish; (5) the racemose type of inflorescence is thought to be more primitive than the corymbose type; (6) the leaves of the ancestral species were probably entire and amplexicaul; (7) trichomes were not present in the more primitive species and their presence is held to be a sign of specialization. The genus is believed to have originated in Arizona and *S. ambiguum* is the most primitive species. A complete taxonomic treatment is given for the 11 species native to America north of Mexico. The following new species, new transfers and new names occur: *Sisymbrium ambiguum* (*Thelypodium ambiguum* Wats.), *S. juniperorum*, *S. aureum* (*Thelypodium aureum* Eastw.), *S. elegans* (*Thelypodium elegans* Jones), *S. Vaseyi* (*Thelypodium Vaseyi* Coulter), *S. Watsonii* (*S. Vaseyi* Wats.), *S. linearifolium* (*Streptanthus linearifolius* Gray).—E. B. Payson.

3597. REHDER, ALFRED. New species, varieties and combinations from the herbarium and the collections of the Arnold Arboretum. Jour. Arnold Arboretum 3: 207-224. 1922.—The present article contains the following new species, varieties, hybrids, combinations and names: *Juniperus squamata* var. *Meyeri*, *J. lucayana* var. *bedfordiana* (Loud.), *Pinus nigra* var. *cebensensis* (Godr.), *Potentilla fruticosa* var. *Purdomii*, *R. Maximowicziana* var. *Jackii* (Rehd.), *R. omeiensis* f. *chrysocarpa*, *Hamamelis virginiana* f. *rubescens*, *Skimmia Reevesiana* f. *rubella* (Carr.), *R. Reevesiana* f. *variegata*, *S. Foremanii* var. *Rogersii* (Mast.), *Cotinus coggygria* f. *purpureus* (Dupuy-Jam.) × *Ilex Beanii*, *I. Macfadyenii* (Walp.), *Viburnum corymbosum* (Mill.), *Euscaphis japonica* var. *ternata*, *Acer stenolobum*, *A. cappadocicum* f. *rubrum* (Kirchn.), *A. Buergerianum* var. *trinerve* (Dipp.), *A. Opalus* var. *tomentosum* (Tausch), *A. Hersii*, *Aesculus discolor* var. *Koehnei*, *A. turbinata* var. *pubescens*, *Zizyphus jujuba* Mill. var. *inermis* (Bge.), *Rhamnus Alaternus* f. *argenteo-variegata* (West.), × *Ceanothus pallidus* var. *roseus* (Spach), × *C. pallidus* var. *plenus*, *Vitis Thunbergii* var. *sinuata* (Reg.), *V. Piasezkii* var. *Pagnucci* (Romanet du Caill.), *Camellia elongata* (Rehd. & Wils.) and *Viburnum Sargentii* f. *flavum*. The synonymy of *Ilex vomitoria* Ait. and of *Ceanothus coerulea* Lag. and × *C. Delilianus* Spach is also discussed. [See Bot. Absts. 8, Entry 734; 10, Entry 370; 11, Entry 4862].—Alfred Rehder.

3598. REHDER, ALFRED. Two new Asiatic poplars. Jour. Arnold Arboretum 3: 225-227. 1922.—*Populus Purdomii* from northwestern China and *P. koreana* from Korea are described.—Alfred Rehder.

3599. ROSEN, F. Über die Samen einiger Speisekürbisse. [Concerning the seeds of a few squashes.] Beitr. Biol. Pflanzen 14: 1-17. Fig. 1-24. 1920.—The many varieties of squashes may all be grouped under the 3 species: *Cucurbita Pepo* L., *C. maxima* Duch., and *C. moschata* Duch. The anatomical differences in the seeds of the first 2 species are discussed in detail as bearing on the origin of the different garden forms of squashes.—Orton L. Clark.

3600. SANDS, W. N. Botanical notes on the Brazil nut tree in Malaya. Malayan Agric. Jour. 10: 130-132. 1922.—Young [Bot. Gaz. 52: 226. 1911] discussed the origin of the Brazil nut and assigned it to *Bertholletia nobilis*. Petch [Ann. Roy. Bot. Gard. Peradeniya 5: 421. 1914] reported on the Brazil nut as cultivated in Ceylon and decided that the characters of *B. nobilis* and *B. excelsa* were alike exhibited in the tree at Peradeniya in such a way as to shake belief in the distinctness of the 2 species. Deshmukh [Gard. Bull. Straits Settlements 2: 435. 1921] did the same for trees in Singapore with the same result. In this paper Sands reports on trees at Kuala Lumpur, but gives no personal opinions.—I. H. Burkill.

3601. SARGENT, C. S. Notes on North American trees, X. Jour. Arnold Arboretum 3: 182-207. 1922.—This paper deals chiefly with *Crataegus* and the following species and varieties are described as new: *Crataegus swanensis*, *C. ohioensis*, *C. Warneri*, *C. poliophylla*, *C. steno-*

sepala, *C. abbreviata*, *C. desertorum*, *C. tripartita*, *C. anamesa*, *C. antiplasta*, *C. antimima*, *C. sutherlandensis*, *C. sutherlandensis* var. *spinescens*, *C. caerulescens*, *C. ellipticifolia*, *C. marietensis*, *C. waldensis*, *C. rotundifolia* var. *aboriginum* (Sarg.), *C. rotundifolia* f. *rubescens*, *C. mercerensis*, *C. meiophylla*, *C. Margaretta* var. *Brownii* (Britt.), *C. Margaretta* var. *xanthocarpa*, *C. Harveyana*, *C. conjungens*, *C. choriophylla*, *C. Croomiana*, *C. Victorinii*, *C. carollensis*, *C. kingstonensis*, *Betula neoalaskana*. A note on *Gleditsia texana* Sarg., which is considered a hybrid between *G. triacanthos* and *G. texana*, concludes the article. [See also Bot. Absts. 8, Entry 740; 10, Entry 372; 11, Entry 4865.]—*Alfred Rehder*.

3602. SCHINZ, HANS, und ALBERT THELLUNG. Beiträge zur Kenntnis der afrikanischen Flora (XXX.) [Contributions to a knowledge of the African flora (XXX.).] Vierteljahrsschr. Naturf. Ges. Zürich 55: 221-256. 1921.—The following new species and varieties are described: *Celosia Schaeferi* Schinz, *Cyathula hereroensis* Schinz, *Podalyria pulcherrima* Schinz, *Borbonia parviflora* Lam. var. *glabrescens* Schinz, *Buchenroedera Jacottetii* Schinz, *Argyrobolium glaucum* Schinz, *Rhynchosia Dinteri* Schinz, *R. Jacottetii* Schinz, *R. sordida* Schinz (*R. Orthodanum* Benth. *Orthodanum sordidum* E. Mey.), *Eriosema ellipticifolium* Schinz, *E. fasciculatum* Schinz, *Hermannia hyssopifolia* L. var. *integerrima* Schinz, *H. setosa* Schinz, *Gnidia clavata* Schinz, *G. psilotoides* Schinz, *Anticharis azurea* Dinter, *Vernonia pinifolia* (Lam.) Less. var. *canescens* (Rehm.) Thell., *V. hirsuta* (DC.) Sch. Bip. × *pinifolia* (Lam.) Less. Schlechter & Thell. hybr. nov. = *V. adulterina* Thell., *Aster Peglerae* Bolus var. *longipes* Thell., *Felicia erucifolia* Thell., *Chrysocoma subumbellata* Thell., *Helichrysum Moesianum* Thell., *H. aretioides* Thell., *Lopholaena pauciflora* Thell., *L. longipes* (*Doria longipes* Harv.), *Othonna denticulata* Ait. var. (?) *Schlechteri* Thell., *Senecio achilleifolius* DC. var. *glandulososcaberr* Thell., *S. Serra Sonder* var. *longipedunculatus* (Volkens) Thell., *S. albanensis* DC. var. *pseudo-decurrens* Thell., *S. serratuloides* DC. var. *typicus* Thell., var. *Rehmannii* Thell., var. *Dieterleni* Thell., var. *Holubii* Thell., *S. isatiedus* DC. var. *typicus* Thell. var. *macrophyllus* Thell., *Ursinia Jacottetiana* Thell., *U. Bolusii* Thell., *Dicoma thyrsoflora* (Klatt) Thell., *Sonchus delagoënsis* Thell., *S. scapiformis* Thell., *Crepis hypochoeridea* (DC.) Thell. var. *Junodiana* (O. Hoffm.) Thell., var. *Woodii* Thell., var. *genuina* Thell.—*John H. Schaffner*.

3603. SCHINZ, HANS, und ALBERT THELLUNG. Weitere Beiträge zur Nomenklatur der Schweizerflora (VII.) (Beiträge zur Kenntnis der Schweizerflora XVIII.) [Further contributions to the nomenclature of the Swiss flora (VII.) (Contributions to a knowledge of the Swiss flora XVIII.)] Vierteljahrsschr. Naturf. Ges. Zürich 66: 257-317. 1921.—Various emendations and corrections of the names of Swiss plants are recorded. The following new combinations occur: *Trichophorum pumilum* Schinz & Thellung (*Scirpus pumilus* Vahl.), *Hymenolobus pauciflorus* Schinz & Thellung (*Capsella pauciflora* Koch), *Erysimum silvestre* (Crantz) Scop. subsp. *helveticum* (Jacq.) Schinz & Thellung and subsp. *Cheiranthus* (Pers.) Schinz & Thellung, *Viola montana* L. subsp. *Ruppii* (All. pro. spec. pro parte, Gaudin sub. *V. montana* pro parte) Schinz & Thellung, *Senecio capitatus* (Wahlenb.) Steudel var. *tomentosus* (DC.) Schinz & Thellung.—*John H. Schaffner*.

3604. SCHLECHTER, R. Beiträge zur Flora von Afrika XLIX. Campanulaceae-Lobeliaee novae africanae. (Contributions to the Flora of Africa XLIX. [New African Campanulaceae of the tribe Lobeliaee.] Bot. Jahrb. 57: 615-625. 1922.—The following species and varieties are described as new: *Lobelia Galpinii*, *L. omphalodoides*, *L. Seineri*, *L. dolichopus*, *L. ilysanthoides*, *L. Kirkii* R. E. Fries var. *microphylla*, *L. knysnensis*, *L. Ledermannii*, *L. odontoptera*, *L. pilosa*, *L. Rudatisii*, *L. Stolzii*, *L. transvaalensis*, *L. ardisiandroides*, *L. dichroma*, *L. Schaeferi*, and *Laurentia longiflora*.—*K. M. Wiegand*.

3605. SZABÓ, Z. Beiträge zur Flora von Afrika. XLIX. Diagnoses Cephalariarum novarum. [Contributions to the flora of Africa XLIX. Diagnoses of new Cephalarias.] Bot. Jahrb. 67: 641-644. 1922.—The following species are described as new: *Cephalaria Galpiniana*, *C. Zeyheriana*, *C. Wilmsiana*, *C. pungens*, *C. taurica*, *C. Sieberi*, and *C. rupestris* Griseb.—*K. M. Wiegand*.

3606. VILLAR, EMILIO del. El género *Gossypium* en España. [The genus *Gossypium* in Spain.] *Broteria Sér. Bot.* 20: 49-72. 1922.—The literature relating to the growth and occurrence of cotton in Spain contains many points that require clearing up, especially as regards the forms actually cultivated. The author's work is based upon collections made in Granada, Malaga, Cadiz, Seville, and Cordova, taken in connection with a digest of the information in some 30 publications, of which a list is given. A résumé of the various species proposed for cultivated cottons is given, with notes upon the validity of the different forms. The author concludes that, taking Schumann's classification as a basis only *Gossypium herbaceum* and *G. bardadense* or their hybrids have been grown in Spain, at least during the past 150 years. Reports of the occurrence of *G. arboreum* seem based upon a misreading of the Arabian author Abu-Zacaria. Of *G. herbaceum* only the variety *hirsutum* seems to occur in cultivation, though some strains indicate traces of hybridization with var. *indicum*. The author describes in detail material of *G. bardadense* representing the "tipo motrileño" of Clemente, no longer cultivated; material from Barrancho de Cantarrijan of the *bardadense* type that has survived cultivation for some 15 years in a semi-wild state; and the 2 sorts cultivated in Malaga under the name "Jumel" (*bardadense*) and "Upland" (*herbaceum*) with two hybrid forms.—*E. B. Chamberlain.*

3607. WINKLER, HUBERT. Beiträge zur Flora von Papuasien. VIII. Die Urticaceen Papuasien. [Contributions to the flora of Papuasias VIII. The Urticaceae of Papuasias.] *Bot. Jahrb.* 57: 501-608. 15 fig. 1922.—This region is very rich in Urticaceae many of which are endemic. Keys to the species are given, also extensive notes on structure and distribution. The following new species, varieties, combinations and names are proposed: *Laportea decumana* (Roxb.) Wedd. var. *pedunculata* (*L. pedunculata* Lauterb. & K. Schum.); *L. Schlechteri*; *L. Reckingeri*; *L. crenulata* Gaud. var. *nitida*, and var. *nervosa*; *L. mammosetosa*; *L. Warburgii*; *Pilea stenoneura*; *P. pellis crocodili*; *P. cuneata*; *L. plicatidentata*; *P. caudata*; *P. effusa*; *P. Schlechteri*; *P. papuana*; *P. Ledermanni*; *P. stellarioides*; *P. minutissima*; *Elatostena cyrtandra*; *E. Lauterbachii*; *E. articulatum*; *E. elegans*; *E. macrophyllum* Brongn. var. *majusculum* (*E. frutescens* (Bl.) Hassk. var. *majuscula* K. Schum.); *E. Pulleanum*; *E. serra*; *E. annulatum*; *E. novo-guineense* Warb. var. *latifolium*, var. *trapesoideum*, var. *stenopus*, and var. *uber*; *E. Ledermanni*, *E. macropus*; *E. subintegrum*; *E. sesquifolium* (Reinw.) Hassk. var. *ramosum*, and var. *caudatum*; *E. piliferum*; *E. cupulare*; *E. densum*; *E. Lingelsheimii*, also its var. *adscendens* and var. *seriatum*; *E. peperomioides*; *E. tenuicaule*; *E. rudicaule*; *E. velutinicaule*; *E. Reiterianum*; *E. mongiense* Lauterb. var. *gracile*; *E. trichomanes*; *E. hymenophyllum*, and var. *Stollei*; *E. tricuspe*; *E. longicollum*; *E. fragile*; *E. barbarufa*; *E. Pellionianum* Gaud. var. *pedunculatum*, var. *effusum*, and var. *Novae-Britanniae* (*E. Novae-Britanniae* Lauterb.); *E. angulare*; *E. pauperatum*; *E. undulatum*; *E. Warburgii* (*Pellionia nigrescens* Warb.); *E. Hoffmannianum*; *E. peltifolium* (*Pellionia peltata* Ridl.); *E. Weinlandii* K. Schum. var. *vestitum*, var. *dispar*, var. *Kochii* (*Pellionia Kochii* Valet.), and var. *ylense* (*E. ylense* Hall. f.); *E. cauliflorum*; *E. Hallieri*; *E. paramelanum*; *E. inamoenum*; *E. lanceolatum*; *E. Hoelscherianum*; *E. Janowskyi*; *E. jabiense*; *E. pedunculatum* Forst. var. *angustum*; *E. Grüningii*, and var. *Krausei*; *E. frutescens* (Bl.) Hassk. var. *fusCIFurFuracea*, var. *novoguineense* (*Procris frutescens* var. *novoguineense* Valet.), var. *sculptum*, and var. *caudatum*; *E. decurrens*; *E. rectangulare*; *Cypholophus rotundifolius*; *C. decipiens*, and var. *tenuifolius*; *C. pachycarpus*; *C. radicans*; *C. patens*; *C. reticulatus*; *C. Englerianus*; *C. velutinus*; *C. trapula*, and var. *hirsuta*; *C. Gjellerupii*; *C. Ledermanni*; *C. nummularis*; *C. chamaephyton*; *C. vaccinioides*; *C. Treubii*, *C. Friesianus* (*Pilea Friesiana* K. Schum.); *C. integer*; *C. Pulleanus*, *Pipturus verticillatus*; *P. subinteger*; *P. Ledermanni*; *P. Pullei*; *P. lithospermum*; *P. repandus* (Bl.) Wedd. var. *rufescens*; *Conocephalus hirsutus*; *C. subscaber*; *C. ambuinensis* (Zipp.) Warb. var. *crassus*, and var. *longifolius*; *C. Paxianus*; *C. Gjellerupii*; *Leucosyke rhodopleura* (*Villebrunia rhodopleura* Bl.); *L. montana*; *L. pulchra* (*Debregeasia pulchra* Ridl.); *Maoutia grandifolia* (*Pipturus grandifolius* Ridl.); *M. ambigua* Wedd. var. *Warburgii* (*M. Warburgii* Boerl.), var. *villosa*, var. *scyphochlamys*, and var. *Chalmersi*.—*K. M. Wiegand.*

3608. WOLF, W. Notes on Alabama plants. *Amer. Midland Nat.* 8: 104-127. Pl. 1-3. 1922.—A new genus of monotropoid plants, *Cryptophila* gen. nov., is described from Alabama.

Cryptophila pudica sp. nov. is the new species and *C. pudica* forma *maxima* f. nov. and *C. pudica* var. *Knapkei* var. nov. are also described. The genus is placed in a new tribe, viz., *Cryptophileae*. It differs from tribe *Eumonotropeae* in having a one-celled ovary (several-celled near the base) and indehiscent fruit; and from tribe *Pleuricosporae* in having anthers opening by pores and indehiscent fruit. The plants seem to be true saprophytes. They grow, flower, and fruit under a cover of leaves. The habitat is given as the xerophile mixed forest of the upland. The flowering scapes make their appearance in October and November; anthesis occurs in March and April; and fruit matures in July and August. Nothing is known of the geographical range. The type specimens were collected in St. Bernard, Cullman County, Alabama, and have been deposited in the herbarium of St. Bernard College.—Ray C. Friesner.

REVISIONS AND MONOGRAPHS

3609. JEPSON, WILLIS L. **Revision of the California species of the genus *Arctostaphylos*.** *Madroño* 1: 76-96. Fig. 1-3. 1922.—The author deals with 23 species and 10 varieties, giving descriptions, synonymy, geographical, ecological and taxonomic notes and a key. The following new species, varieties and combinations are made: *A. glauca* Lindl. var. *eremicola*, *A. mariposa* Dudley var. *bivisum*, *A. patula* Greene var. *incarnata*, *A. manzanita* Parry var. *apiculata*, *A. pastillosa*, *A. nummularia* Gray var. *myrtifolia* (*A. myrtifolia* Parry), *A. sensitiva*, *A. glandulosa* Eastw. var. *vestita* (*A. vestita* Eastw.), *A. glandulosa* Eastw. var. *crassifolia*, *A. glandulosa* Eastw. var. *virgata* (*A. virgata* Eastw.), *A. Andersonii* Gray var. *auriculata* (*A. auriculata* Eastw.), *A. Andersonii* Gray var. *pechoensis* (*A. pechoensis* Dudley). The author utilizes the biological reaction of the various forms to fire as a support for the conception of species that he has adopted.—Roxana Stinchfield Ferris.

3610. JEPSON, WILLIS L. **Revision of the California species of the genus *Downingia* Torr.** *Madroño* 1: 98-102. Fig. 1-4. 1923.—Critical diagnoses and a key to the 7 species of *Downingia* recognized by the author are given and the following new variety and new combination are made: *D. pulchella* Torr. var. *arcana*, *D. bicornuta* Gray var. *montana* (*D. montana* Greene).—Roxana Stinchfield Ferris.

3611. MACKENZIE, K. K. **A monograph of the California species of the genus *Carex*.** *Erythea* 8: 7-95. Fig. 1-51. 1922.—This work rests primarily upon an extensive series of specimens of both the early and the recent collectors in California. In addition to the formal diagnoses there is critical discussion of relationships and of doubtful points, full citation of localities, references to the literature for each species, and a general bibliography. One hundred and twenty-six species are described, 10 being new: *Carex stenoptera*, *C. Dudleyi*, *C. fracta*, *C. Tracyi*, *C. unilateralis*, *C. Helli*, *C. paucicostata*, *C. breviligulata*, *C. montereyensis*, and *C. flaccifolia*. One new combination is made: *Carex ormantha* (*C. echinata* Murr. var. *ormantha* Fernald).—W. L. Jepson.

3612. PAYSON, EDWIN BLAKE. **A synoptical revision of the genus *Cleomella*.** Univ. Wyoming Publ. Bot. 1: 29-46. 1922.—*Cleomella* is a Capparidaceous genus that extends from Oregon and central Idaho to south-central Mexico and from Texas to California. Eighteen species are recognized provisionally and a key to these is provided. Descriptions are given for each species and specimens and synonyms are cited. *C. mexicana* Moç. & Sessé is the generic type. The following new species are described: *C. Macbrideana* and *C. mojaviensis*.—E. B. Payson.

3613. WILSON, ERNEST HENRY, and ALFRED REHDER. **A monograph of *Azaleas*, *Rhododendron* subgenus *Anthodendron*.** Publ. Arnold Arboretum 9. 8 vo. 3 + 219 p. Cambridge, Massachusetts, 1921.—The work is divided into 2 parts: The *Azaleas of the Old World* by E. H. Wilson (pp. 1-105) and the *Azaleas of North America* by A. Rehder (pp. 107-205) followed by an index to both parts. In the first part E. H. Wilson gives, after short introductory chapters on the history, distribution and classification, a systematic enumeration of all species, varieties and forms spontaneous as well as cultivated of the *Azaleas of the Old*

World with keys to the sections, (among which is the new section *Sciadorhodion* Rehd. & Wils.) and to the species, and a complete synonymy under each recognized group and a citation of specimens examined followed by detailed remarks on the history, distribution, taxonomic characters, cultivation etc. Four sections and 34 species with numerous varieties and forms are recognized by the author and the following new species, varieties, forms, hybrids, combinations and names are proposed: *Rhododendron indicum* f. *polypetalum* (Maxim.), f. *lacinia-tum*, (Mak.), *R. Kanehirai*, *R. obtusum* f. *macrostemon* (Maxim.), f. *amoenum* (Lindl.), f. *japonicum* (Maxim.), var. *Kaempferi* (Planch.), var. *Kaempferi* f. *albiflorum*, f. *multicolor*, f. *plenum*, f. *Komatsui* (Nak.), f. *monstrosum*, f. *cryptopetalum* (Maxim.), f. *mikawanum* (Mak.), × *R. Sanderi*, *R. Simsii* var. *vittatum* (Fort.), var. *vittatum* f. *Bealii* (Fort.), var. *eriocarpum* (Hay.), *R. phoeniceum* f. *semiduplex*, f. *Smithii* (Sweet), f. *splendens* (D. Don), var. *calycinum* (Lindl.), var. *calycinum* f. *Maxwellii* (Hort. Wezelenburg), *R. mucronatum* f. *Noordianum* (Wittm.), f. *Mattapan* (Hovey), f. *narcissiflorum* (Planch.), f. *sekidera* (Komatsu), var. *ripense* (Mak.), f. *amethystinum*, f. *plenum* (Sims), *R. linearifolium* var. *macrosepalum* f. *dianthiflorum* (Carr.), f. *decandrum*, *R. reticulatum* var. *albiflorum* (Mak.), f. *pentandrum*, × *R. mixtum*, *R. japonicum* f. *aureum*, *R. luteum* var. *macranthum* (Bean). In the second part, A. Rehder, gives, after a short introduction dealing with the classification history and distribution, a systematic enumeration of the species, varieties and forms spontaneous and cultivated of the Azaleas of North America of which 17 species belonging to 2 sections are recognized; a key to the species precedes the enumeration and under each group the complete synonymy and a description is given followed by a citation of specimens examined and by detailed remarks. This enumeration of the American species is followed by a chapter on hybrids of the subgenus including those of the Old World preceded by a short historical sketch on the origin of the cultivated hybrids; all the hybrids known are enumerated with remarks on their history and distinguishing characters. A list of doubtful names and of illustrations of garden forms (exclusive of Indian Azaleas) not mentioned elsewhere in the book concludes the second part, in which the following new species, varieties, forms and hybrids are proposed: *R. canadense* f. *albiflorum* (Rand & Redf.), f. *viridifolium* Fernald, *R. occidentale* var. *sonomense* (Greene), *R. calendulaceum* f. *aurantium* (Sweet), *R. nudiflorum* var. *glandiferum* (Porter), *R. roseum* (Loisel.), *R. alabamense*, *R. canescens* f. *subglabrum*, var. *candidum*, *R. atlanticum* (Ashe), f. *neglectum* (Ashe), var. *luteo-album* (Coker), *R. serrulatum* f. *molliculum*, var. *georgianum*, *R. viscosum* f. *rhodanthum*, var. *glaucum* f. *rubescens* (Sweet), var. *tomentosum* (Dum.-Cour.), var. *montanum*, var. *montanum* f. *coerulescens*, var. *aemulans*, *R. arborescens* var. *Richardsonii*, × *R. gandavense* (K. Koch), var. *plenum*, × *R. Anneliesae*, × *R. viscossepalum* (Gard. Chron.), var. *Daviesii* (Gard. Chron.), × *R. norbitonense* var. *aureum* (Paxt.), var. *broughtonianum* (André), × *R. Crouxii* (Croux), f. *plenum*. Incidentally the new name *R. Adamsii* is proposed for *R. fragrans* Maxim. not Paxt. (*Azalea fragrans* Adams).—A. Rehder.

FLORISTICS AND PLANT DISTRIBUTION

3614. ANONYMOUS. Schedae ad Floram Romaniae exsiccatae, a museo botanico Universitatis Clusienensis editam. Centuria 1 et 2. [Exsiccatae illustrating the flora of Roumania, edited by the Botanical Museum of the University of Cluj.] Bull. Inform. Grăd. Bot. Muz. Bot. Univ. 1: 1-24. 1921; 2: 18-36. 1922.—Among the 2 centuries of plants issued under the above title the following numbers are especially noteworthy: no. 80, *Melampyrum nemorosum* L. subsp. *romanicum* Borza n. subsp. with original diagnosis; no. 82, *Plantago Schwarzenbergiana* Schur. f. *macrophylla* and f. *microphylla* Schur. with critical notes by Al. Borza; no. 99, *Centaurea dacica* Borza n. sp. with original diagnosis; no. 151, *Castalia Lotus* (L.) Tratt. from the region of Oradea Mare, the only known European locality; no. 179, × *Anchusa Procopiani* Gagul. n. hyb., a hybrid between *Anchusa procera* Besser and *A. ochroleuca* M. B. with original diagnosis; no. 194, *Leontopodium alpinum* Cass. f. *laxiflorum* (Roch) Borza, and f. *intregaldense* Borza with critical notes.—M. Tiesenhausen.

3615. ANONYMOUS. [Rev. of: ACHARIYAR, RAI BAHADAR K. RANGA, assisted by C. TADULINGA MUDALIYAR. A handbook of some south Indian grasses. vi + 318 p. Butter-

worth and Co.: Calcutta; Constable and Co.; London, 1921 (see Bot. Absts. 11, Entry 3426).] Nature 110: 376. 1922.—[See also Bot. Absts. 11, Entry 2321.]

3616. BLATTER, E. Flora Arabica, Part III. Campanulaceae-Verbenaceae. Rec. Bot. Surv. India 3: 283-365. 1921.—This consists of a list of species with bibliographic citations, synonyms, citation of specimens, distribution, and local names. No new names appear.—E. D. Merrill.

3617. BORZA, A. Note critice asupra speciei colective *Melampyrum nemorosum* și formele intrudite din România. [Critical observations on the collective species *Melampyrum nemorosum* and the related forms in Roumania.] Bul. Soc. Stiinte Cluj 1: 141-148. 1921.—Two species of *Melampyrum* are found in Roumania, which have colored bracts. These are: *M. bihariense* A. Kerner and *M. nemorosum* L. subsp. *romanicum* Borza. Of the latter two forms occur which the author designates as *M. nemorosum* subsp. *romanicum* Borza proles *aestivalis coronense* (Ove Dahl) Borza, and *M. nemorosum* subsp. *romanicum* Borza var. *viride* (Schur) Borza. The author endeavors in this way to eliminate the confusion which has hitherto prevailed in regard to this species-complex.—*M. Tiesenhausen*.

3618. COCKS, R. S. A list of the shrubs of Louisiana. Jour. Arnold Arboretum 3: 173-182. 1922.—The author presents a systematic list of the shrubs found in Louisiana with notes on their distribution and flowering and fruiting time.—*Alfred Rehder*.

3619. BURTT DAVY JOSEPH. The distribution and origin of *Salix* in South Africa. Jour. Ecology 10: 62-86. 6 fig. 1922.—The dimorphic character of the leaves presents a difficulty in distinguishing the willows of Africa. The present author distinguishes 22 named species and varieties, 20 being local endemics usually occurring in one river basin only. Six occur in South Africa, 12 in tropical Africa and Madagascar while 1 species only is common to South and central Africa. Each drainage basin usually carries 1 species only. The isolation of species has been brought about by: (1) the intermittent flow of streams, (2) the regular and prolonged character of the dry season on the watersheds and, (3) the density of the tropical rain-forest vegetation. Isolation is clearly connected with the evolution of distinct types. Hybrids are rare. The species are not relics but modern types apparently descended from *Salix safsaf* of tropical Africa and Syria which has given rise to a western and an eastern group. The migration in tropical Africa has been up the Nile basin and along the Congo and Zambesi river systems while in South Africa it has been around the coast. Of the 22 recognized species and varieties two varieties, namely, *S. mucronata* Thunb. var. *integra* and *S. mucronata* Thunb. var. *caffra* are new.—*Geo. D. Fuller*.

3620. EWART, A. J. Contributions to the flora of Australia, No. 29. Proc. Roy. Soc. Victoria (N. S.) 33: 226-232. 2 text fig. 1921.—The following plants and their source are included: *Asperula scoparia* Hook. f. var. *elongata* Benth., *Bartsia Trixago* L., *Bassia quinque-cuspis* F. v. M. var. *villosa* Benth., *Beyeria virgata* n. sp. (figured), *Claytonia perfoliata* Don., *Eleusine indica* Gaertn., *Erica lusitanica* Rud., *Eucalyptus miniata* A. Cunn., *Frankenia setosa* W. V. Fitzg., *Grevillea ceratocarpa* Diels., *G. incrassata* Diels, *Kyllingia intermedia* R. Br., *Medicago echinus* DC., *M. minima* L., *Microcala filiformis* Hoff. & Link., *Muscari botryoides* Mill., *M. racemosum* Mill., *Notholaena distans* R. Br., *Panicum piligerum* F. v. M., *P. repens* L., *Pimelea Husseyana* F. v. M., *Polygonum articulatum* R. Br., *Psammomya* Diels & Loes., *Ptilotus* R. Br., and *Trichinium* R. Br., *Sclerochloa dura* Beauv., *Selaginella stolonifera* Spring, *Suriana maritima* L.—*Eloise Gerry*.

3621. FISCHER, C. E. C. A survey of the flora of the Anaimalai Hills in the Coimbatore District, Madras Presidency. Rec. Bot. Surv. India 9: 1-218. Pl. 1-5, map, index I-XXI. 1921.—A simple enumeration of the 1828 species found in the area. No new names appear. The introduction contains notes on the topography, geology, climate, peoples, botanical history, and the general characters of the flora.—*E. D. Merrill*.

3622. GAMBLE, J. S. *Flora of the Presidency of Madras. Part V.* p. 769-962. Adlard and Son and West Newman: London, 1923.—This part includes the families Ebenaceae to Scrophulariaceae ending with the genus *Ilysanthes*. The following new combinations are indicated: *Linociera zeylanica* (L. *purpurea* Vahl), *Rejoua dichotoma* (*Tabernaemontana dichotoma* Roxb.), *Brachystelma brevitubulatum* (*Ceropegia brevitubulata* Bedd.), *Cordia evolutior* (*C. fulvosa* var. *evolutior* C. B. Clarke), and *Torenia travancorica* (*T. asiatica* Hook. f., in part).—J. M. Greenman.

3623. HOLMBOE, JENS. Den gamle lind med flogrognen ved "Stiftsgaarden" i Bergen. [The old *Tilia* with the "flogrogn" (*Sorbus*) at "Stiftsgaarden" in Bergen.] *Naturen* 46: 111-119. *Fig. 1-4.* 1922.

3624. HOLMBOE, JENS. Dverg-aalegraesset (*Zostera nana* Roth.) og dets forekomst ved den norske kyst. [*Zostera nana* and its occurrence on the Norwegian coast.] *Naturen* 46: 313-320. *Fig. 1-4.* 1922.

3625. HOLMBOE, JENS. *Leontodon hispidus* L., en sen indvandrer i Vestlandets og Sørlandets flora. [*Leontodon hispidus* L., a late immigrant in the flora of western and southern Norway.] *Bergens Mus. Aarb. Naturv. Raekke* 1920/1921²: 1-11. *Fig. 1, 1 map.* 1922.—This plant was discovered as new to Norway in 1833 and was later found to occur in 2 different parts of the country, viz. on small areas in western Norway on the islands of southwestern Hordaland, the Haugesund peninsula and on Karmøyen, as well as a single occurrence in southern Norway on the Barland peninsula near Kragerø. The occurrence and distribution is thoroughly discussed and also the European distribution. The author is of the opinion that the plant has far from reached its northern limit, and the reason for its peculiar distribution is that the plant has immigrated comparatively recently. His opinion is that *Leontodon hispidus* has immigrated to western Norway from England or Scotland, and to the Kragerø district from Denmark or Sweden. The length of the period elapsed since the immigration is uncertain, but is perhaps not long, even according to human chronology.—K. Münster Ström.

3626. KELLER, ROBERT. Studien ueber die geographische Verbreitung schweizerischer Arten und Formen des Genus *Rubus*. [Studies on the geographical distribution of the Swiss species and forms of the genus *Rubus*.] *Vierteljahrsschr. Naturf. Ges. Zürich* 64: 519-538. 1919.—This is the 4th contribution on the subject and gives habitats and localities of species, varieties, and forms, besides Latin descriptions of 8 new forms. Those described as new are: *R. cuspidifer* f. *harpagonifer* Sudre & Keller, *R. tomentosus* f. *invincatus* Rob. Keller, *R. foliosus* f. *conjungens* Rob. Keller, *R. foliosus* f. *rhenanus* Rob. Keller, *R. furvus* f. *pallidus* Rob. Keller, *R. furvus* f. *pallidistamineus* Sudre & Keller, *R. tereticaulis* f. *subangulatus* Rob. Keller, *R. tereticaulis* f. *densispinus*, Rob. Keller.—John H. Schaffner.

3627. LAWSON, P. B. A list of the grasses of Douglas County. *Trans. Kansas Acad. Sci.* 30: 336-339. 1919/21 [1922].—The author presents a list, without annotations, of 107 grasses in Douglas County, Kansas, made in connection with a study of leaf hoppers.—F. C. Gates.

3628. LONG, BAYARD. *Sonchus uliginosus* occurring in the Philadelphia area. *Torreyia* 22: 91-98. 1922.—*Sonchus uliginosus* Bieb., a species of the Caucasus region, first discovered in Pennsylvania by H. W. Pretz along a railroad embankment near Allentown on Sept. 22, 1917, has since been reported from many stations in Northampton, Lehigh, Bucks, and Philadelphia Counties in Pennsylvania and Newcastle County, Delaware, lying within a rectangle about 70 miles north and south by 30 miles east and west, with its center of frequency in Bucks Co. The species is thoroughly established, and threatens to become a persistent weed. The mode of introduction cannot be determined. This species has been reduced by some students to *S. arvensis* L. var. *glabrescens* Günth., Grab. & Wimm., but appears to be distinct.—J. C. Nelson.

3629. MACKENZIE, KENNETH K. The records of *Limnobia Spongia* in the northern United States. *Torreyia* 22: 102-104. 1922.—*Limnobia Spongia* (Bosc) Richard, with its center of distribution in the southern United States, is an extremely rare and local plant in the northern States, where it has not been collected for nearly 25 years. Knieskern's report for New Jersey has not been confirmed. Three authentic specimens are known to exist from New York, 4 from Delaware, 1 from Virginia, 2 from Illinois and 4 from Missouri. No specimen from Indiana is known.—J. C. Nelson.

3630. MAIDEN, J. H. An alphabetical list of Victorian eucalypts. *Proc. Roy. Soc. Victoria*, (N. S.) 34: 73-84. 1922.—This supplements A Census of Victorian Eucalypts and Their Economics [Rept. Australian Assoc. Adv. Sci. 14: 294. 1913] by R. T. Baker. Sixty-two species are considered to be indigenous.—Eloise Gerry.

3631. MAIDEN, J. H. A few notes on the botany of Lord Howe Island (Sixth paper). *Proc. Linn. Soc. New South Wales* 45: 564-566. 1921.—The 1920 collections of J. L. Boorman and others for the National Herbarium, Sydney, are reported. These include known forms and a number of new records for the following presumably indigenous species: *Malvastrum tricuspidatum* A. Gray, *Erythraea australis* R. Br., *Mesembryanthemum australe* Sol., *Kyllinga monocephala* Rottb., *Adiantum formosum* R. Br., *Howea Forsteriana* Becc. (rachises and leaflets variegated). Characteristics of hybrid Howeas are discussed. New records for the following introduced plants are reported: *Ageratum conyzoides* L. (garden escape), *Galinsoga parviflora* Cav., *Aster subulatus* Michx., *Eupatorium cannabinum* L., *Sisymbrium officinale* L., *Stachys arvensis* L., *Datura Stramonium* L., *Nicotiana alata* Link & Otto (garden escape), *Daucus brachiatus* Sieb., *Asparagus plumosus* var. *nanus* Baker (garden escape), *Dactyloctenium aegyptiacum* Willd.—Eloise Gerry.

3632. MAIDEN, J. H. The forest flora of New South Wales. Vol. VII. Parts 61-70. p. i-xvii. John Spence: Sydney, 1922.—The author has issued a title-page and general index for Vol. VII of the above work.—J. M. Greenman.

3633. MENEZES, CARLOS A. DE. Subsídios para o estudo da Flora do Archipelago da Madeira. [Materials for the study of the Madeiran flora.] *Broteria Sér. Bot.* 20: 113-119. 1922.—This article aims to distinguish species or varieties not occurring in the Flora do Archipelago da Madeira (1914) and to correct errors in that work. Twenty species or varieties are mentioned, of which 13 represent new localities for, or introductions into the flora mentioned. The author proposes 6 forms as new: *Sinapidendron sempervivifolium*, *Ononis Costae*, *Sempervivum Barreti*, *Myosotis Welwitschii* Boiss. & Reut. var. *madeirensis*, *Semele androgyna* (L.) Kth. var. *macrophylla*, *Asparagus Loweii* Kth. var. *portomonizensis*.—E. B. Chamberlain.

3634. MOXLEY, GEORGE L. *Brickellia microphylla* (Nutt.) Gray. *Bull. Southern California Acad. Sci.* 20: 34-35. 1921.—Localities are given for this and other plants in southern California and a new combination, *Thelypteris Feei* (C. Chr.) Moxley (*Dryopteris Feei* C. Chr.) is made.—Roxana Stinchfield Ferris.

3635. NELSON, JAMES C. Additions to the flora of western Oregon during 1921.—*Toreya* 22: 98-102. 1922.—A list is presented of 28 species found growing spontaneously, of which 18 are introduced. The total number of species reported by the author which are not included in Piper & Beattie's Flora of the Northwest Coast has now reached 371. Corrections and range-extensions of 18 species previously reported are appended.—J. C. Nelson.

3636. PARKER, R. N. On the supposed occurrence of *Salix alba*, Linn. in the Northwest Himalaya. *Indian Forester* 48: 444-445, 1922.—The author states "that as far as known *S. alba* Linn. is not found, either wild or cultivated in N.-W. India."—E. N. Munns.

3637. RIKLI, M. Die arktisch-subarktischen Arten der Gattung *Phyllodoce* Salisb. [The Arctic-subarctic species of the genus *Phyllodoce* Salisb.] Vierteljahrsschr. Naturf. Ges. Zurich 66: 324-334. 15 fig. 1921.—The author presents a systematic treatment with descriptive notes and maps showing the distribution of the species.—*John H. Schaffner*.

3638. TOVEY, J. R. The Australian species of *Carex* in the National Herbarium of Victoria. Proc. Roy. Soc. Victoria (N. S.) 34: 42-48. 1921.—The systematic arrangement of Australian species of *Carex* according to Kükenthal in Engler's Pflanzenreich IV-20 (1909) is given, together with notes on the distribution of the species in the National Herbarium. This arrangement differs from Mueller's Census of Australian Plants.—*Eloise Gerry*.

3639. TOVEY, J. R., and P. F. MORRIS. Contributions from the National Herbarium of Victoria.—No. 1. Proc. Roy. Soc. Victoria (N. S.) 34: 207-212. Figs. 1-2. 1922.—Descriptions of 2 new species *Bossiaea Laidlawiana* (Leguminosae) and *Choretrum pendulum* (Santalaceae) are given together with several new records of regional distribution and the establishing of a new variety, *Helichrysum rosmarinifolium* Less. var. *ledifolium* (*H. ledifolium* Bth.) and a number of foreign plants in Victoria.—*Eloise Gerry*.

MISCELLANEOUS

B. E. LIVINGSTON, *Editor*

S. F. TRELEASE, *Assistant Editor*

3640. ANONYMOUS. Ten-year program of the New York Agricultural Experiment Station. Science 57: 16-17. 1923.

3641. CAMPBELL, ELMER GRANT. A pocket dissecting scope. Science 57: 179-180. 1923.—A new design is suggested and its advantages are noted. Two figures are given to show the parts in cross section.—*C. J. Lyon*.

3642. CONN, H. J. The preparation of staining solutions. Science 57: 15-16. 1923.—A request is made for the cooperation of biologists in putting the formulae of staining solutions on the basis of so many cc. of saturated solution per given volume of the desired solution.—*C. J. Lyon*.

3643. CONN, H. J. The standardization of biological stains. Science 57: 24-25. 1923.—Attention is called to the fact that this work is no longer carried on by the National Research Council, but by an independent commission.—*C. J. Lyon*.

3644. FONTANEL, P. Séchage des plantes pour l'herbiers. [The drying of plants for herbaria.] Sci. Agric. 3: 157-159, 192-193. 1922-23.—Methods of value in the drying of herbarium specimens are outlined.—*T. G. Major*.

3645. HILL, WM. H. Biochemical problems in agriculture as related to food. Sci. Agric. 3: 105-109. 1922.—A number of problems requiring study are suggested, including carbohydrate sources, manufacture and handling of desiccated fruits and vegetables, pectin from cull apples, value and rôle of yeast as a diet accessory, utilization of straw and sawdust for feeding purposes, and fibre-making possibilities of native grasses.—*T. G. Major*.

3646. MARTIN, GEORGE W. Food resources of the sea. Sci. Monthly 15: 455-480. 1922.—There is a limit to the number of human beings the earth can support. Not much has been done to utilize the food in the sea, especially the plants. In China and Japan and to a less extent in Europe a few of the algae are eaten. The plants of the sea must have mineral salts and light. The temperature is less variable than on land, and CO₂ is more plentiful. The benthos or shallow water group contains *Zostera marina*, a pondweed, and similar plants in

large quantities; *Ulva*, *Enteromorpha*, *Cladophora*, *Vaucheria*, *Lyngbya*, *Spirulina* are found in the shallow water, while *Fucus*, *Ascophyllum*, *Sargassum*, and other rock weeds where it is deeper. The *Laminarias* and their allies come in below tide level. In still deeper water the red algae appear along with others. The plankton contains many unicellular plants, especially the Diatoms and the Peridineae.—Peterson and his associates have concluded that the plankton plays little part in the nutrition of sea animals. These derive their food from the detritus of the sea bottom which is largely composed of the fine particles of decayed plants, primarily *Zostera*.—*L. Pace*.

3647. MOORE, BARRINGTON. The proposed Roosevelt-Sequoia National Park and the Barbour bill. *Science* 57: 82-84. 1923.—This is a defence of the Barbour bill against the attack made upon it in an article by Dr. Van Name (*Science* 56: 705-707. 1922). It is pointed out that the giant redwoods will receive as much protection as at present and that many scenic features will be added to the present Sequoia National Park, particularly in the nature of river canyons that are now threatened by water power development plans.—*C. J. Lyon*.

3648. VEITCH, ROBERT, and WILLIAM GREENWOOD. The food plants or hosts of some Fijian insects. *Proc. Linnean Soc. New South Wales* 46: 505-517. 1921.—In the investigation of sugar-cane pests in the Fiji Islands a number of food plant records were obtained for parasitic, predacious, and blood-sucking insects. About forty plants are included in the records.—*Eloise Gerry*.

3649. WOODFIN, J. C. Vinegar making in small quantities. *New Zealand Jour. Agric.* 24: 171-173. 1922.—Methods are described for making vinegar so as to retain flavor and keeping qualities.—*N. J. Giddings*.

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